# Annual Report
on the
# ENVIRONMENT
## 2001





*County employees and citizens work together to protect the environment through stream valley cleanups, volunteer stream monitoring programs, stream stabilization projects, and tree plantings.*

Fairfax County, Virginia
## Environmental Quality Advisory Council

# ANNUAL REPORT
# on the
# ENVIRONMENT

## 2001


Fairfax County, Virginia

## Environmental Quality Advisory Council

Printed on recycled paper

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# INTRODUCTION

This year's Annual Report on the Environment has been prepared entirely by the Environmental Quality Advisory Council (EQAC). Staff support for the coordination and printing of the Report has been provided by the Planning Division of the Department of Planning and Zoning.

The Annual Report on the Environment, which is an update on the state of the County's environment, serves a threefold purpose. Initially, it is intended to assist the Board of Supervisors in evaluating ongoing environmental programs and to provide the basis for proposing new programs. The document also aids public agencies in coordinating programs to jointly address environmental issues. In addition, the report is directed to citizens who are concerned with environmental issues.

The Report contains chapters on major environmental topics including: water resources; air quality; ecological resources; deer management; waste management; hazardous materials; noise, light, and visual pollution; and land use and transportation. Within each chapter are: a discussion of environmental issues; a summary of relevant data; and a discussion of applicable government programs. Where relevant, discussions of legislative issues are provided. Each chapter concludes with recommendations that identify additional actions that EQAC believes are necessary to address environmental issues.

This report covers activities affecting the environment in 2000; however, in some cases, activities from early 2001 are also included. This report is meant to serve as an update from the 2000 *Annual Report on the Environment*; the reader is advised to review the 2000 *Annual Report* if more background information about a particular topic is desired.

While the Environmental Quality Advisory Council has prepared and is responsible for this Report, contributions were made by numerous organizations. Many of the summaries provided within this report were taken verbatim from materials provided by these organizations. EQAC therefore extends its appreciation to the following organizations:

Fairfax County Department of Health
Fairfax County Department of Systems Management for Human Services
Fairfax County Department of Planning and Zoning
Fairfax County Department of Public Works and Environmental Services
Fairfax County Environmental Coordinator
Fairfax County Fire and Rescue Department
Fairfax County Park Authority
Fairfax County Police Department, Division of Animal Control
Fairfax County Sheriff's Office
Fairfax County Water Authority
Fairfax Joint Local Emergency Planning Committee
Fairfax ReLeaf
Interstate Commission on the Potomac River Basin
Lake Barcroft Watershed Improvement District
Metropolitan Washington Airports Authority (MWAA)
Metropolitan Washington Council of Governments (COG)
Northern Virginia Regional Commission
(formerly the Northern Virginia Planning District Commission)
Northern Virginia Soil and Water Conservation District
United States Geological Survey
Upper Occoquan Sewage Authority

Virginia Department of Conservation and Recreation
Virginia Department of Game and Inland Fisheries
Virginia Department of Environmental Quality
Virginia Department of Transportation

In addition, EQAC wishes to acknowledge the efforts of the County's interagency Environmental Coordinating Committee, which coordinated the staff responses to the recommendations within EQAC's 2000 *Annual Report on the Environment*.

FAIRFAX
COUNTY
V I R G I N I A

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

Madam Chairman and Members of the Board:

EQAC is pleased to present our 2001 Annual Report on the Environment. This report covers 2000, but also includes significant actions from 2001 that could impact EQAC's comments and recommendations.

Until several years ago, EQAC's Annual Reports noted the fragmentation of environmental activities among the County's agencies and recommended a position be established to coordinate these activities. The Board of Supervisors did respond to this recommendation and created an Environmental Coordinator position, reporting to the Deputy County Executive. As a result, environmental activities have been less fragmented for the last few years. We now see the County staff taking another step to improving this coordination with the formation and subsequent actions of the Environmental Coordinating Committee (ECC) – consisting of the Deputy County Executive and department heads who oversee environmental activities. The ECC has already made an impact on staff activities. One example is the greatly improved staff responses to last year's EQAC recommendations. Another example is a joint meeting between EQAC and ECC, with more to come. The actions of the Environmental Coordinator and the ECC are resulting in improvements in the County's environmental policies, and we congratulate the Board of Supervisors and County staff for their foresight in creating the position and the Committee.

EQAC reiterates two recommendations as our top priorities. The first is to develop and implement a Countywide Natural Resource Management Plan. The only active progress occurring in this area is by the Fairfax County Park Authority, but the Park Authority only provides a shoestring budget and the effort only covers a part of the County. We note that the Park Authority has been working on a Natural Resource Management Plan for years, without completing the plan. EQAC believes that inadequate resources are being devoted to the development of this plan, hence the slow progress. EQAC urges the Park Authority to increase resources and complete the plan. As part of the staff response to last year's EQAC recommendations, an ad hoc team consisting of technical staff of several County agencies has begun to meet to develop options and recommendations for a Countywide natural resources management plan for ECC consideration. EQAC supports this action and urges a rapid process that results in the Board of Supervisors starting a Countywide program to develop and implement such a plan.

The second recommendation deals with the County's streams. Again we continue to recommend that the County create a Countywide Stream Protection Plan. Your funding of a two-year baseline study of the County's stream valleys, which resulted in the *Stream Protection Strategy* (SPS) report, was a necessary start. However, the County needs to follow this study very rapidly with an overall strategy that sets goals for each watershed. Furthermore, the County needs to establish programs for restoration and preservation of the stream valleys based on these goals as fast as possible. EQAC commends the Board of Supervisors for the efforts you are making to protect and restore local streams.

The problem is that without a funding source, nothing can happen. EQAC is concerned about the ability of the County to fund needed programs to protect and restore our streams. While the Board of Supervisors has provided funds for follow-on programs to the SPS, a secure funding source does not exist. Furthermore, EQAC is concerned that, with today's economic slowdown, environmental programs such as this will be cut. Toward that end, EQAC continues to recommend the speedy adoption of a Stormwater Utility Program – not more studies. Additionally, the County must change the Public Facilities Manual to allow environmentally friendly techniques in stormwater management and stream restoration. Speed is essential in acting on, and implementing, a Countywide Stream Protection Plan. Our streams have inadequate protection and continue to deteriorate.

Each chapter of this year's Annual Report contains the remainder of our suggestions. We urge your consideration and action on each of these.

On 27 July 2001, EQAC sent the Board of Supervisors a letter concerning some of the Board's land acquisitions. In this letter, EQAC expressed support for the efforts that the Board has taken over the past year to acquire and protect open space, and we encouraged the Board to continue to take advantage of opportunities to acquire park land as these opportunities present themselves. Much of the land that the Board has acquired has significant environmental value, and it is the view of EQAC that the acquisition of this land reflects considerable foresight on the part of the Board. EQAC commends the Board of Supervisors for these actions.

As we have done in the past, we would like to commend the outstanding efforts of some groups whose actions enhance the environmental quality in Fairfax County. We have already mentioned the Park Authority staff – a few people, working with a very small budget. The Northern Virginia Soil and Water Conservation District (NVSWCD) continues to make their efforts felt in many environmental areas. Fairfax ReLeaf continues to promote tree preservation and tree replacement programs. Volunteers in the Adopt-A-Stream Program and the Audubon Naturalist Society (and the NVSWCD) provide valuable data on water quality. The Northern Virginia Conservation Trust (NVCT) is pursuing and obtaining easements on privately owned environmentally sensitive land. EQAC is especially pleased that the Board of Supervisors has entered into a public-private partnership with NVCT.

EQAC thanks all these hard working groups, as well as many others we haven't mentioned, for their efforts in advancing environmental quality in Fairfax County.

Members of EQAC wrote this report; however, we obtained most of the information contained therein from many County agencies. We thank these agencies for their assistance. EQAC would also like to acknowledge the contributions of two individuals. First, Noel Kaplan of the Environment and Development Review Branch, Department of Planning and Zoning. Noel provides County staff support to EQAC. This means he sets up every EQAC meeting, attends every EQAC meeting, follows up on actions generated from the meetings, plus coordinates the inputs and publication of the Annual Report. EQAC thanks him for his hard work and long hours in our support. Second, Kambiz Agazi, Environmental Coordinator, Office of the County Executive. Kambiz provides full support to EQAC, attending every EQAC meeting and providing advice and suggestions. EQAC thanks him for his valuable contributions.

We would like to commend the Board's actions, as noted in this report, in advancing the environmental quality of the County. However, much more needs to be done. Your leadership continues to be essential to advancing environmental quality in Fairfax County by preserving and protecting environmentally sensitive areas. We in EQAC will continue to provide recommendations to you on how to achieve this goal. We look forward to working with you and achieving further progress in this area.

Respectfully submitted,

Robert D. McLaren, Chairman
Environmental Quality Advisory Council

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## Progress Report on 2000 Recommendations

# I. WATER RESOURCES

| Water Resources Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC strongly recommends implementation of a Comprehensive Countywide Steam Management Program. | Over the past year, DPWES realigned several fragmented stormwater management agencies into a single line of business. DPWES completed a baseline evaluation of Fairfax County streams, reporting this in a stream assessment report (Stream Protection Strategy), and is proposing to develop watershed master plans for the entire County over five to seven years. Other monitoring programs, outside DPWES, exist and there is no coordination of these by a central body or agency. | The stream assessment report is an outstanding start. Efforts should continue to the foundation of an overall Stream Management Program. EQAC continues to emphasize this recommendation. | In process, with much to be done. |
| 2. EQAC recommends the funding of the Stormwater Utility Program. The Program should place equal importance on environmental protection, restoration, and monitoring as compared to infrastructure improvement and maintenance. The Program should also include a Watershed Board to oversee the Program. | DPWES is responsible for a Stormwater Utility implementation strategy. A study, *Conceptual Plan for a Comprehensive Stormwater Management Program*, was completed in March. DPWES proposes to develop watershed master plans over the next five to seven years. As needs are identified in these plans, DPWES will initiate a public education effort. As public awareness increases, DPWES anticipates citizen understanding and support for a Stormwater Environmental Utility will become strong. | EQAC again reiterates its comments from prior years, with emphasis added. EQAC is concerned about the slowness of the process described by DPWES, with no clear end in sight. EQAC reiterates its recommendation, strongly urging the Board of Supervisors to **speedily** adopt a Stormwater Environmental Utility Program. Without this program, EQAC is concerned about the continued availability of funds for a Comprehensive Countywide Steam Management Program. | No. |

| Water Resources Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 3. EQAC recommends posting of County streams with health warnings for fecal coliform bacteria where appropriate. Additionally, EQAC recommends a County study to identify the source of these bacteria and the implementation of a plan to remove the source of this pollution. | No method of continuous sampling exists that would be appropriate to monitor all portions of all streams. Posting or not posting a sign would not give an accurate assessment of a stream's potential danger at any given time due to fluctuations of fecal coliform counts in the streams. The Health Department continues to work with County, State, and Federal agencies in the development of a system to test for and identify fecal coliform sources in the streams. The Health Department issues a general advisory to avoid contact with any open body of water where activities could cause ingestion of water or contamination of an open wound. This general advisory is disseminated to the public by several methods. The Office of Public Affairs, with the Health Department, will be developing a public education program. | At present, the public is unaware of the potential dangers posed by elevated fecal coliform bacteria counts in the County's streams -- and this situation needs to be corrected. EQAC feels that posting is appropriate, but a very vigorous public awareness campaign could also work. The important point is that the public needs to be informed of this potential public health problem. | Not yet, but the proposed public education program may be adequate. |
| 4. EQAC recommends a review of the County's regulations and the Public Facilities Manual (PFM), and a review of the sequence of waiver determinations to see if they can be altered to increase protection of the County's streams. | The first part of the recommendation, review of regulations and the PFM, is being addressed. County staff is reviewing these to identify impediments to Low Impact Development and will report findings to the Board of Supervisors' Environment Committee in the Fall of 2001. The second part of the recommendation, review of waiver determinations, has been addressed. County staff concluded that changes in the timing of waiver determinations would not result in any improvements to the County's streams. However, the staff recommended that the Environmental Coordinating Committee review the special exception and waiver process and, if warranted, prepare specific recommendations for improvement. | EQAC is pleased that progress is being made, and waits to see what recommendations for improvements will come forth. However, EQAC still has concerns about which structures and requirements are effective and working well in what conditions in Fairfax County and will recommend that data be collected to evaluate how well waivers and PFM facilities are working. | In process. |

| Water Resources Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 5. EQAC recommends an accounting of all costs, by both County and private individuals and entities, spent to counter the effects of siltation and erosion in County streams. | The County does not require the reporting of such costs from private entities. Accounting for County costs would require the development of a methodology that doesn't exist today. Staff recommends, as an alternative, that the costs of various approaches be developed as part of the process of conducting and implementing watershed master plans. | EQAC believes that this recommendation should be followed in order to assess the cost of not moving forward with an overall watershed protection and stream bank stabilization program. | No. |
| 6. EQAC commends the Board of Supervisors in hiring addition inspectors, and providing for training, to handle construction site inspection responsibilities. EQAC recommends continued monitoring of complaints to determine if the strengthened inspection function results in a decline of violations and complaints. | DPWES is developing metrics to evaluate the levels of performance by inspectors and is undertaking additional training. | EQAC is pleased with the progress that has been made in this area. EQAC will continue to monitor progress and continues to recommend that the County monitor complaints. | In process. |

## II. AIR QUALITY

| Air Quality Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC recommends that the County take steps to integrate air quality planning needs more directly into the County planning process. | The County has a telecommuting program and is active in regional efforts to increase telecommuting efforts. Further, the County's Department of Transportation (DOT) is involved in a number of efforts that support the use of transit and reduction of motor vehicle trips. DOT is also actively involved in the development review process and seeks commitments from developers, where appropriate, for traffic reduction and mitigation measures. In 1989, DPZ evaluated air quality impacts for broad land use concepts and possible transportation systems as part of the "Fairfax Planning Horizons" process. | The County has, and does, include air quality information in some aspects of the planning process. However, EQAC is not aware of any direct action taken to address our concerns. Until additional staffing occurs, the County will continue to struggle with circumstances that are gradually slipping out of the County's control. | Partially. |
| 2. EQAC recommends that the County take a hard look at the development of "smart growth" strategies for improving air quality in the County. | It is staff's view that this is a worthy endeavor and should be done. A new air quality planner position would be beneficial in doing this. The Planning Commission, the Transportation Advisory Committee, and EQAC may wish to create a joint subcommittee to discuss in more detail EQAC's concerns, philosophy, and recommendations. | The County must develop its own capability to systematically evaluate air quality compliance needs and address them. "Smart growth" is one strategy, other options may exist. EQAC agrees with staff that the County should heighten its focus on air quality planning needs. EQAC would be pleased to participate in further discussions to clarify its concerns and recommendations. | No. |

| Air Quality Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 3. EQAC recommends that the County follow up its increase in representation on the Metropolitan Washington Air Quality Committee (MWAQC) by considering the need for more comprehensive ongoing review and reporting on vital issues of concern to air quality planning. | The Health Department does have membership on the Technical Advisory Committee, a subcommittee of the MWAQC. However, due to limited staff resources, it has been difficult for the Health Department to stay current with all air quality monitoring, enforcement, control strategies, and compliance issues. Therefore, current County efforts with respect to regional air quality planning issue fall short of the level of effort recommended by EQAC. A new air quality planner position would be beneficial in this area. | EQAC notes that over a period of years, the County's manpower in air quality monitoring, enforcement, and planning has been reduced. As the staff's reply notes, the current manpower does not allow the level of effort in air quality planning that EQAC feels is needed. This situation needs to be corrected. | No. |

## III. ECOLOGICAL RESOURCES

| Ecological Resources Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC recommends that the County BOS develop and implement a Countywide Natural Resource Management Plan. Two tasks should be done first: complete a Countywide Baseline Natural Resource Inventory and adopt a unified Natural Resource Conservation Policy. The BOS should reinstate funding for the Ecological Resources Inventory Committee. | The County has ecological resource guidance within its Policy Plan and the Park Authority's Park Comprehensive Plan contains guidance regarding natural resource preservation. The Park Authority is in the process of creating a Natural Resource Management Plan for parklands. An ad hoc team of technical staff of several County agencies has begun to develop options and recommendations for a Countywide natural resources plan and a revised ecological resources inventory. This ad hoc team will report to the Environmental Coordinating Committee (ECC) in 2001. The Park Authority staff, with assistance from GIS staff, have been investigating methodologies and resources needed for natural resource inventories. | As noted in earlier Annual Reports on the Environment, EQAC commends the Park Authority and fully supports its efforts. EQAC is pleased to see that County staff is addressing this recommendation, with options and recommendations to go to the ECC. However, the Park Authority has been working on a Natural Resource Management Plan for years, without completing the plan. EQAC believes that inadequate resources are being devoted to the development of this plan, hence the slow progress. EQAC urges the Park Authority to increase resources and complete the plan. | Some progress, but much more needs to be done. |
| 2. EQAC recommends that the County BOS emphasize public-private partnerships that use private actions such as land purchases and easements to protect forests and other natural resources. | On October 30, 2000, County staff recommended that the Board of Supervisors form a public-private partnership with the Northern Virginia Conservation Trust (NVCT). A memorandum of understanding to this effect has been developed and signed. | EQAC is pleased that a public-private partnership now exists between Fairfax County and NVCT. EQAC encourages full support to this partnership and an aggressive program aimed at protecting environmentally sensitive land through purchases and easements. | Yes. EQAC will monitor to determine the success of the program. |

## IV. DEER MANAGEMENT IN FAIRFAX COUNTY

| Deer Management Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC recommends that the Board of Supervisors continue to implement and monitor the comprehensive deer management program as set forth in the November, 1998 Integrated Deer Management Plan. | In the fall of 2000, 17 parks were selected as potential sites for deer herd reduction. Infrared activated cameras are now being used to assess deer population densities and are proving to be a valuable tool. An effort was made to move the program from dealing with "hotspots" to a more comprehensive approach, allowing control efforts to be initiated at an earlier stage (and preventing natural areas being subjected to the level of damage seen at some larger parks). | EQAC notes that actions taken to date are starting to address the problem, but the results are a long way from restoring natural areas to the former levels of biodiversity. EQAC encourages the County to reduce the deer population so that former levels of biodiversity can be restored. | Partially. |
| 2. EQAC strongly endorses ongoing public input into the deer management plan. | The Deer Management Committee, reconvened in 1999, met again in the fall of 2000 to review and comment on the results of management efforts and on staff recommendations for the coming season. Comments were sought by means of a questionnaire mailed to a sample of households near parkland. The County web page devoted to deer management issues has been updated and expanded. | These efforts provide the opportunity for public input and should continue. | Yes. |

| Deer Management Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 3. EQAC believes the deer management program must address problems of small private property owners. | It has become routine procedure to inform citizens of options allowed under law. The County Deer Management web page links to additional sources for information on these programs. In one situation, the County assisted a private property owner in acquiring a special permit from the Virginia Department of Game & Inland Fisheries to allow a hunt on his property the same day that a managed hunt was being done on adjacent parkland. Fairfax County has and will continue to work with private landowners who control property adjacent to public lands to develop and coordinate deer management programs. | EQAC agrees that the County's role is to make the landowners aware of actions they can take to solve deer problems on their properties. Fairfax County needs to work with all property owners with deer management problems, not just those adjacent to public lands. | Well along. |
| 4. EQAC believes the management program must accomplish: (1) immediate, sustained reduction of the deer population; (2) ongoing monitoring of availability of methods for maintaining population limits; and (3) consideration of development and its effects on ecosystem health and biodiversity. | Managed hunts, sharpshooting, and private/public management partnerships combine to apply the necessary control pressure to first stabilize and then reduce deer herds. Fairfax County continues to monitor developments and progress on non-lethal methods of deer herd control such as immunocontraception. However, this method will not be available as a management tool for at least 10 years. Fairfax County has established a Natural Resources Management Plan Team to explore possible efforts to address the effects of development on the County's ecological resources through the development of a Natural Resources Management Plan. | While programs have started, and have achieved some successes, EQAC believes the programs must accomplish the immediate, sustained reduction of deer population. The present programs have not accomplished this. | Programs underway. |
| 5. EQAC recommends the Board of Supervisors continue to provide for a vigorous and enhanced program of public education. | Educational efforts have been underway since the inception of the Fairfax County Integrated Deer Management Plan. While a wide variety of mediums for information dispersal have been used, additional means are being explored -- including a better use of the County's cable TV. The Fairfax County Deer Management web page provides information and a new brochure (Deer Management in Fairfax County) has been distributed. | EQAC commends the Staff for its public education efforts, noting that these efforts must continue. | Yes. |

## V. WASTE MANAGEMENT

| Waste Management Recommendation | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC is concerned about being able to meet minimum waste tonnage requirements at the Energy/Resource Recovery Facility (E/RRF)and the resulting impact on recycling programs. EQAC recommends: (1) external no cost assistance in the recycling programs; (2) a full-time marketer position to obtain contracts for waste; and (3) examine costs and benefits associated with burning renewable recyclables. | Staff works with companies to promote purchases of recycled products from businesses in the County. Staff is also involved in efforts to promote recycling information for companies involved in waste management in the County and communicates with businesses impacted by recycling initiatives. DPWES is examining developing a more active citizen volunteer program. The E/RRF is currently receiving sufficient waste to meet contractual requirements, with this year's waste expected to exceed last year's by over one million tons. Fairfax County has modified Chapter 109, Code of Fairfax County, to give the Director, DPWES, the ability to remove recycling requirements from any commodity. Therefore, if commitments require the County to use the E/RRF to burn recyclables, the County has that flexibility. | Staff is to be commended in its efforts to ensure that minimum waste tonnage requirements are being met. While tonnage shortfalls seem to no longer be a problem, the situation can change. EQAC suggests that the Board of Supervisors continue to place a high priority on identifying and securing alternate waste sources to ensure that minimum waste tonnage requirements are met. EQAC continues to oppose the use of surplus funding to subsidize tipping fees. This approach is not sustainable. | Yes. |

## VI. HAZARDOUS MATERIALS

| Hazardous Materials Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC strongly encourages the Board of Supervisors to reinstate the Conditionally Exempt Small Quantity Generator (CESQG) program in compliance with State requirements. | County staff is in the process of contracting for a waste disposal firm which will provide all facets of this service, including acceptance, handling, and disposal of hazardous wastes from CESQG sources. The contractor would contract directly with the generator, with the County backing the program through public notices. | EQAC continues to recommend the reinstatement of the CESQG program. EQAC will monitor the proposed staff solution to ensure that a successful CESQG program results. | In progress. |
| 2. EQAC supports ongoing public education on how to properly dispose of household/residential, industrial, and commercial hazardous wastes. | Staff efforts include brochures and literature, automated telephone information numbers, and the County web site. However, funding for a more expansive outreach/education program is not available. | EQAC recommends a more aggressive program. A suggestion would be a "How To" chart that can be easily read and kept for continued reference. | Partially complete. |

## VII. NOISE, LIGHT POLLUTION, AND VISUAL POLLUTION

| Noise, Light and Visual Pollution Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. EQAC recommends the Board of Supervisors continue to monitor the FAA TRACON consolidation project. | It is the staff's view that the County should continue to monitor this issue. A draft EIS for airspace redesign is expected in 2001. | County staff is monitoring this issue and intends to continue. EQAC will review the EIS when released and provide comments. | In progress. |
| 2. EQAC recommends that the Board of Supervisors investigate and establish zoning and noise requirements to ensure commercial helicopter service does not result in intolerable noise. | There are no provisions in either the Zoning Ordinance or the Noise Ordinance which regulate helicopter noise. This item will be presented to the Board of Supervisors for inclusion in the 2001 Zoning Ordinance Amendment Work Program. | While the possibility of a local heliport seems to have gone away for now, the County does need the ability to regulate helicopter noise when commercial helicopters become a regular occurrence in Fairfax County. | No. |
| 3. EQAC suggests that the Board of Supervisors carefully monitor the noise-related provisions of AIR 21. | The Metropolitan Washington Airports Authority (MWAA) will be working closely with the Metropolitan Washington Council of Governments' Committee on Noise Abatement at National and Dulles Airports (CONANDA) on the development of the Part 150 document. This document will update noise contour information and the assumptions on the mix of aircraft in the fleet that flies in and out of Ronald Reagan Washington National Airport. The study will also allow for the reconsideration of noise abatement procedures. An advisory committee, under CONANDA, will include elected officials from Fairfax County. A technical committee, under CONANDA, will include employees of Fairfax County. The County staff's view is that the County should participate on CONANDA committees to the fullest extent possible. | EQAC agrees with staff that the County should participate on the CONANDA committees to the fullest extent possible. | In progress. |

| Noise, Light and Visual Pollution Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 4. EQAC recommends that the Board of Supervisors direct that future lighting fixtures follow the recommendation of the Illuminating Society of North America (light be directed down). | The Board of Supervisors, on January 24, 2000, approved changes to the Citizen Petition Street Light Program Policy to reduce light pollution from County streetlights. Under the changed policy, new streetlights will use "cutoff" optics that totally direct light downward. However, semi-cutoff cobra head fixtures may be used where cutoff installations are not economically practical to need lighting standards. An amendment to the PFM will address this change. Colonial style fixtures will continue to be used in residential areas (not along major highways as was mistakenly reported in last year's scorecard). Older lights will not be retrofitted due to high costs, but they will be replaced with cutoff cobra head fixtures where possible. The Board of Supervisors included the review of glare performance standards on the 2000 Zoning Ordinance Amendment Work Program. County staff is reviewing the issue and will have recommendations for the Board of Supervisors in six to nine months (in 2002). | This is an improvement over last year's staff response. EQAC will review staff recommendations and comment further in future Annual Reports on the Environment. EQAC does note that Tucson, Arizona, has drastically reduced light pollution and believes that Fairfax County can do the same. | Limited progress. |
| 5. EQAC recommends that the Board of Supervisors work with VDOT and elected officials to replace existing roadway lighting fixtures with those in the previous recommendation. | There are no plans to retrofit existing systems with new fixtures. All new projects being designed by VDOT are adhering to the more stringent criteria for lighting with regard to light pollution and glare. | Again, an improved response over last year's. However, VDOT should develop a program to replace old fixtures when they become inoperable with new full cutoff fixtures. | Limited progress. |

| Noise, Light and Visual Pollution Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 6. EQAC recommends that the Board of Supervisors negotiate and execute an agreement with VDOT such that VDOT would delegate enforcement authority, including penalties, to the County regarding illegal signs in VDOT rights of way. | The new Countywide Sign Task Force, established by the Board of Supervisors, will address this recommendation. | EQAC is pleased that this recommendation is being addressed and will comment on any recommendations made by the Countywide Sign Task Force. | Some progress. |
| 7. EQAC recommends that the Board of Supervisors use a multimedia approach to make citizens aware of Virginia's nuisance statute (Title 48). | The new Countywide Sign Task Force, established by the Board of Supervisors, will address this recommendation. However, it may be that enforcement as recommended in Recommendation #6 above may provide for a more effective remedy. | EQAC is pleased that this recommendation is being addressed and will comment on any recommendations made by the Countywide Sign Task Force. | Some progress. |
| 8. EQAC recommends that the Board of Supervisors authorize the use of volunteers to remove illegal signs from public property and the right-of-way. | The new Countywide Sign Task Force, established by the Board of Supervisors, will address this recommendation. As part of the Task Force review, staff intends to coordinate with representatives of VDOT on this suggestion. | EQAC is pleased that this recommendation is being addressed and will comment on any recommendations made by the Countywide Sign Task Force. | Some progress. |

| Noise, Light and Visual Pollution Recommendations | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 9. EQAC recommends that the Board of Supervisors request the Commonwealth Attorney's Office and the Virginia courts to sentence non-violent offenders to assist in litter and illegal sign removal. | The Community Labor Force provides manual labor by low-risk inmates to Fairfax County. Although this initiative is expanding, its progress has been impeded by lack of capital equipment resources. Despite limited resources, the Sheriff's Office has pursued aggressive initiatives in an effort to enhance the County's community improvement efforts, including removal of illegal highway signs. The Board of Supervisors should consider requesting the Circuit Court, the General District Court, and the Juvenile and Domestic Relations Court to use the Sheriff's Office's Community Labor Force as a sentencing alternative for non-violent offenders. This recommendation will be considered by the Countywide Sign Task Force. | EQAC agrees that the Board of Supervisors should consider requesting the Circuit Court, the General District Court, and the Juvenile and Domestic Relations Court to use the Sheriff's Office's Community Labor Force as a sentencing alternative for non-violent offenders, and urges the Board to do so. | Some progress. |
| 10. EQAC recommends that the Board of Supervisors authorize the hiring of additional employees to address illegal signs. | The issue of the County entering into agreement with VDOT to enforce the State Code limitations on signs in the rights-of-way will be a major issue of discussion with the new Countywide Sign Task Force. The issue of staffing such an effort will also be discussed. | EQAC is pleased that this recommendation is being addressed and will comment on any recommendations made by the Countywide Sign Task Force. | Some progress. |

## LAND USE AND TRANSPORTATION

| Land Use and Transportation Recommendation | Action taken by Agency or Department | EQAC Comments | Completed |
|---|---|---|---|
| 1. Incorporate into County planning and zoning policies: (1) Land use decisions should consider how to reduce congestion in context of growth that is dynamic, multi-cultural and inevitable; (2) The geographic effects of land use decisions should guide which communities and governments participate in decision making; (3) Land use decision over a reasonable threshold should require direct citizen involvement; (4) Staff evaluations of land use and infrastructure proposals should describe cumulative environmental impacts, full-cost pricing, and cost-effectiveness analysis of reasonable alternatives; and (5) Staff evaluations of land use and infrastructure proposals should describe relevant past performance of similar proposals. | Portions of EQAC's recommendations are being addressed, at least to some extent. There is considerable policy guidance within the Comprehensive Plan that supports reductions in traffic congestion. The County's Comprehensive Plan has been developed in recognition of population and employment forecasts for the County and provides a "Concept for Future Development and Land Classification System" that clearly anticipates such growth. With respect to the public participation components of EQAC's recommendation, staff would note that major land use studies incorporate substantial involvement by community task forces. Through this approach, there is direct and considerable citizen involvement within communities that may be affected by decisions based on these studies. Staff feels that there are a number of elements of EQAC's recommendation principles that are in need of clarification. Staff recommends that EQAC's recommendation be forwarded to the Planning Commission and the Transportation Advisory Committee, along with a suggestion that these groups meet with EQAC to foster an exchange of ideas regarding the matters that EQAC has raised. Given that EQAC has made another recommendation regarding planning and development issues in the Air Quality chapter, it may be appropriate for such discussions to consider both EQAC recommendations. | EQAC would be pleased to participate in further discussions to clarify its concerns and recommendations, and will do so in conjunction with discussion on its Air Quality recommendations. | In process. |

ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER I**

# WATER RESOURCES

# I. WATER RESOURCES

## A. OVERVIEW

The water resources of Fairfax County include its streams, groundwater, ponds, and lakes. These serve as sources of drinking water, recreation, and habitat for a myriad of organisms. One-third of the land in the Fairfax County Park system, around 5,000 acres, is stream valley parkland. These stream valleys are significant corridors for the County trails system and wildlife.

### 1. Streams

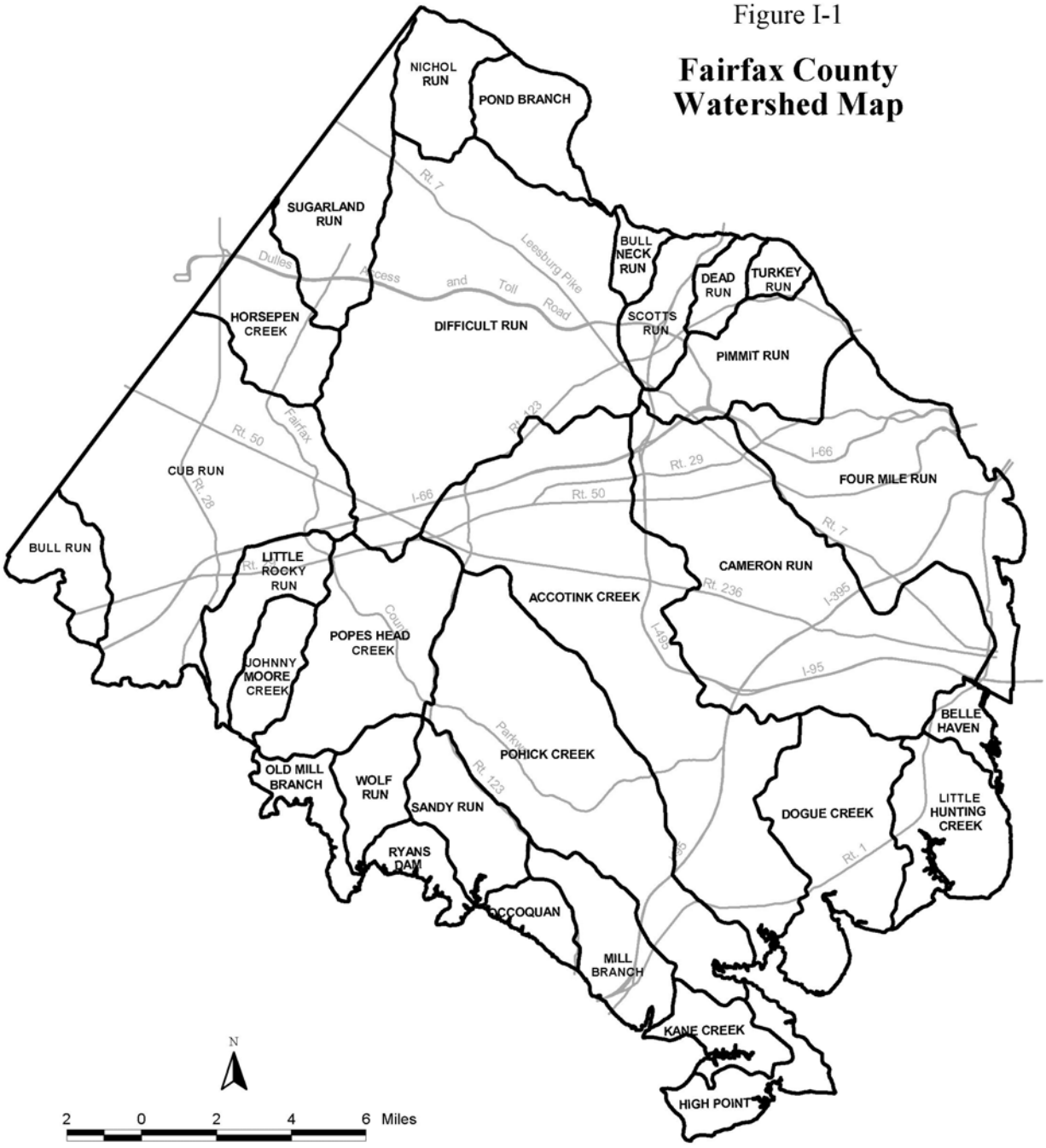
Fairfax County is criss-crossed by a variety of natural streams, often called runs or creeks. These streams are considered flowing water habitats. Rainfall soaks into the earth and drains to low points within the surrounding land, then emerges from the ground as seeps, springs, and trickling headwaters. These tiny threads of running water join with others in the same drainage area to create a stream system. A stream is a system of fresh water moving over the earth's surface. There is a natural progression in size from the smallest tributaries to the largest rivers into which they eventually flow. Perennial streams flow throughout the year and intermittent streams flow only part of the year. There are approximately 850 miles of perennial streams within Fairfax County fed by smaller intermittent headwater streams.

### 2. Watersheds

A watershed is an area from which the water above and below ground drains into a particular stream, river system, or larger body of water. Everyone in Fairfax County lives in a watershed with a name and with drainage boundaries. The larger stream watersheds usually have sub-basins. There are 30 separate drainage basins or watersheds within the County (Figure I-1). For example, the largest watershed in Fairfax County, Difficult Run (58 square miles) has ten streams that drain into the main stream, Difficult Run. It, in turn, drains into the Potomac River. The Potomac River watershed is a sub-basin of the even larger watershed, the Chesapeake Bay watershed, which is 64,000 square miles and extends from New York through Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and the District of Columbia. All Fairfax County streams are in the Potomac River watershed and subsequently the Chesapeake Bay watershed.

Figure I-1

**Fairfax County Watershed Map**



## 3. Stream Ecosystems and Communities

Within a stream are shallow areas called riffles where the velocity is rapid and the bottom consists of boulders, stones, gravel, and/or sand. Dissolved oxygen levels are high because water is flowing over rocks, mixing air into the tumbling water. Alternating with riffles are deeper pools and runs where water speed slows and small particles of mineral and organic matter fall to the bottom and oxygen levels are reduced. Each of these stream regions has a diverse community of plants and animals that spend all or part of their life cycles in the water.

## 4. Communities

The aquatic food chain begins with leaves and other decaying plant and animal material called detritus. These are carried into the stream from the surrounding forests and fields by wind and water runoff. Food sources also include aquatic vegetation such as algae. Bottom–dwelling (benthic) macro (large) invertebrates (back-boneless) animals eat this organic matter. These include snails, clams, aquatic worms and crustaceans such as crayfish, but the most ecologically important are the aquatic insects such as stoneflies, mayflies, caddisflies, and true flies. In turn, these macroinvertebrates are eaten by fish, birds, and other streamside wildlife, such as frogs, salamanders, and small mammals.

## 5. Oxygen

Oxygen is vital to organisms that live in a stream just as it is to terrestrial animals. Submerged animals use oxygen dissolved in the water. Most aquatic insect larvae, such as mayflies and stoneflies, absorb oxygen through their body walls but many are aided by the use of structural gills. Fish absorb oxygen by drawing water in through the mouth where it passes over internal gills. High levels of dissolved oxygen are essential to the life functions of a healthy stream community.

## 6. Trees, Wetlands, and Buffers

A buffer of trees lining the banks of streams is another essential part of a healthy stream system. The temperature in a stream greatly affects how much oxygen it can hold. Since warmer water holds less oxygen, trees are vital along the bank or edge of stream or river. Shade from the tree canopy maintains cool water temperatures so the water will hold more oxygen.

Tree cover also provides food and floating detritus for shelter when leaves and branches fall into a stream. Streamside forests offer food, nesting sites, and protection to a great diversity of streamside wildlife including birds, turtles, beaver, and snakes. Tree roots stabilize fragile stream banks and give cover to fish, crayfish and aquatic

insects. Forested buffers absorb high percentages of excess nutrient runoff.
Wetland areas adjacent to streams can be forested or open wetlands. These wetlands serve as transitions to stream channels and help to attenuate the affect of stormwater and remove pollutants.

### 7. Nutrients

Nitrogen and phosphorus are nutrients essential to the growth and development of all plants. But an overabundance of either can damage stream ecosystems dramatically. Forested buffers can retain and utilize as much as 89% of the nitrogen and 80% of the phosphorus runoff associated with land use practices. In excess, these nutrients become major pollutants causing the rapid growth of algae in streams, rivers, lakes, and estuaries. When the algae dies and begins to decay, the bacteria breaking down the algae uses up the dissolved oxygen necessary for other aquatic life.

## B. POLLUTANTS AND OTHER IMPACTS ON STREAMS

### 1. Point and Nonpoint Source Pollution

Water-polluting substances originate from either nonpoint or point sources. Nonpoint sources (NPS) include surface runoff, atmospheric deposition, and groundwater flow. Because of their diffuse and intermittent nature, NPS are difficult to control. NPS pollutant loads are greatest following rainfall events. A significant part of the NPS load consists of nutrients, including nitrogen and phosphorus (e.g., organic matter, fertilizer), that are substances that stimulate algal growth. Other NPS pollutants are sediment (e.g., from eroding lands, construction sites, and stream banks during high-flow, high-velocity conditions), toxics (e.g., oil, paint, chemicals and metals), pathogens-fecal coliform bacteria (e.g., animal waste, failing septic and leaking sewer systems), and trash.

Point sources are specific locations that discharge pollutants. They are relatively constant and provide a steady flow of pollutants. In the Potomac Basin, most point sources are either wastewater treatment plants (WWTPs) or industrial discharges. Point sources contribute small portions of the nutrient loads during high flows and the majority during low flows.

### 2. The Effect of Imperviousness on Streams

As development occurs, impervious surface increases as driveways and buildings are placed on land that once had trees and other vegetative cover that absorbed water and its contents. With the increase in impervious surface and loss of vegetative cover, there is a concurrent increase in the amount and speed of stormwater running off the land carrying sediment to nearby streams. Sediment is a major non-point source pollutant

reaching streams and rivers that drain to the Chesapeake Bay. Silt and sand scour stream channels, which erodes the banks and causes loss of tree cover. This in turn allows water temperature increases. This silt and sediment also gets deposited on the bottom covering where macroinvertebrates live, cutting off their oxygen supply. This change in bottom substrate usually results in a change in the diversity of organisms—a loss in the numbers and kinds of animals and plants in stream. There is usually a concurrent increase in the numbers of floods that occur where water spills over the banks of streams and onto adjacent lowlands. Over time, this increased flooding and sediment depositions leads to channel widening, loss of pools and riffles and increased pollutant levels. In urban and suburban watersheds, rain flows off impervious surfaces such as parking lots and highways, carrying oil and other automobile wastes into streams. During summer storms, these heated surfaces contribute to raising the temperature of water runoff into streams.

# C. STREAM AND WATERSHED ANALYSES

Ongoing testing is conducted by the Fairfax County Health Department, the Fairfax County Department of Public Works and Environmental Services (DPWES), and the Virginia Department of Environmental Quality (VDEQ). The Audubon Naturalist Society, the Northern Virginia Soil and Water Conservation District, and the County Health Department Adopt-A-Stream program also provide volunteer help and data. At present, the County's Health Department and the Department of Public Works and Environmental Services are both doing comprehensive monitoring of Fairfax County streams. The summary of all this data should provide the first comprehensive understanding of the condition and health of Fairfax County's streams.

## 1. Countywide Stream Assessments

### a. Countywide Stream Protection Strategy Baseline Study

#### i. History

In September, 1997, the Fairfax County Board of Supervisors requested that staff from the Department of Public Works and Environmental Services (DPWES) evaluate the *Montgomery County Maryland, Countywide Stream Protection Strategy* to determine its applicability in addressing water quality issues and provided an initial allocation of $250,000. Upon completion of the evaluation in 1998, the Board approved an additional $250,000. Work was initiated in September of 1998, was completed by December 2000 and was published in January 2001. This study gives a holistic ecological assessment of all County streams.

ii. Study Parameters

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All major non-tidal streams and tributaries within the 30 watersheds of the County have been assessed. The field component of this assessment involved the collection of data from a total of 138 sites/reaches, 13 of which were established as Quality Assurance/Quality Control (QA/QC) sites. Of the 125 principal monitoring sites, 114 were reflective of conditions within Fairfax County and 11 were sampling locations in nearby Prince William Park that were used to aid in the development of "reference conditions" to which all sites were compared. Data collected on the health of streams included the following four components, and a numeric ranking of overall quality was assigned based on these data:

1) Index of Biotic Integrity, or "IBI" (the numbers and kinds of benthic macroinvertebrates present) (Figure I-2);
2) A general evaluation of localized watershed and stream features, including stream channel and adjacent steam valley habitat and stream morphology (figure I-3);
3) Fish taxa present (numbers and diversity of fish) (Figure I-4); and
4) Calculations of the overall of the overall percent impervious cover within each watershed based on upon available Fairfax County GIS data (Figure I-5).

The County will continue long term monitoring of streams with a five-year rotating schedule of sampling so that each site will be resampled at least every five years. Additional data on smaller tributary streams will continue to be provided by volunteer water quality monitors from the Northern Virginia Soil and Water Conservation District and Audubon Naturalist Society. (See below for description of these Volunteer Monitoring Programs.)

iii. Ranking and Results

The ultimate numeric score for each sampling location reflects the site's degree of departure from reference or "highest-quality" conditions. These composite values were then assigned to one of the following qualitative categories: Excellent, Good, Fair, Poor, and Very Poor.

The County stream sites were ranked as follows: Excellent - 8.6%, Good – 14.7%, Fair – 31%, Poor 32.8% and Very Poor –12.9%. Those watersheds that were in good and excellent health had the least amount of impervious surface and the watersheds that were most heavily degraded had the greatest impervious surface. The relationship between impervious surface and one of the measured components of stream health (the Index of Biotic Integrity) is

presented in Figure I-6.

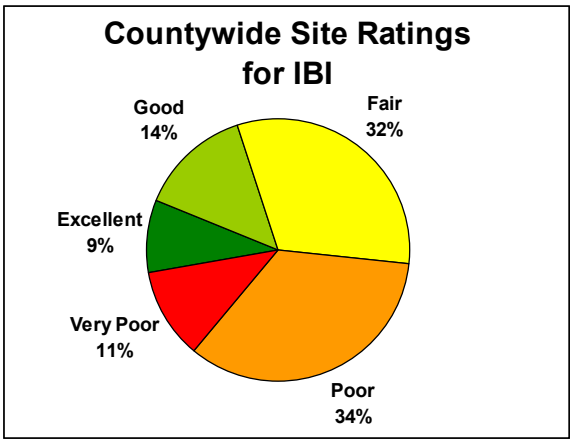


Figure I-2. Percentage of SPS monitoring sites scoring in each of the five IBI quality categories.

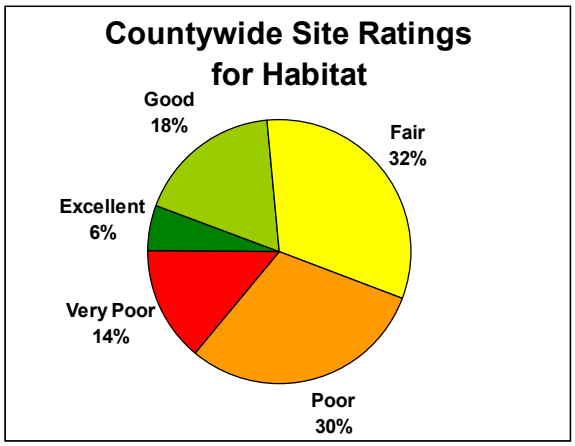


Figure I-3. Percentage of SPS monitoring sites scoring in each of the five Habitat quality categories.

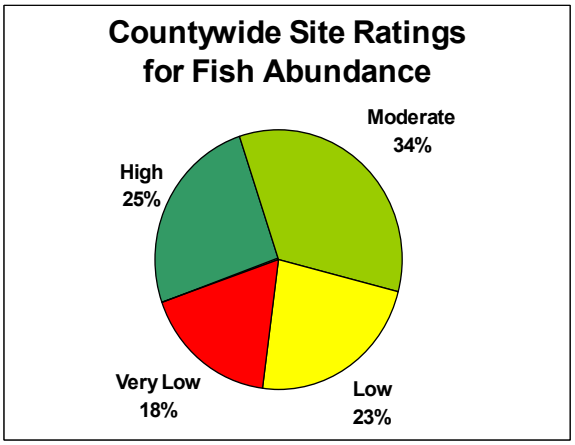


Figure I-4. Percentage of SPS monitoring sites scoring in each of the four Fish abundance categories.

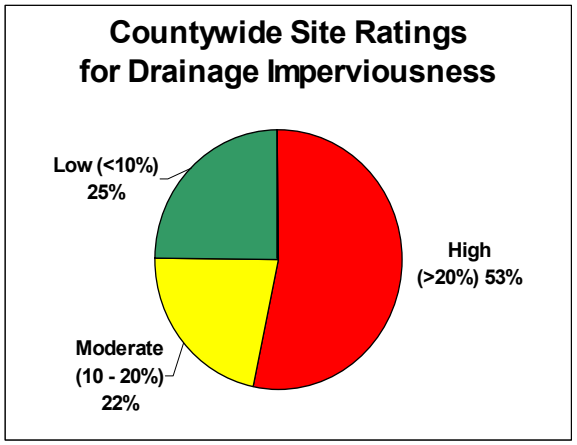


Figure I-5. Distribution of Imperviousness at SPS monitoring sites.

Source of Figures I-2 through I-5: Fairfax County Department of Public Works and Environmental Services, *Fairfax County Stream Protection Strategy, Baseline Study*, January, 2001.

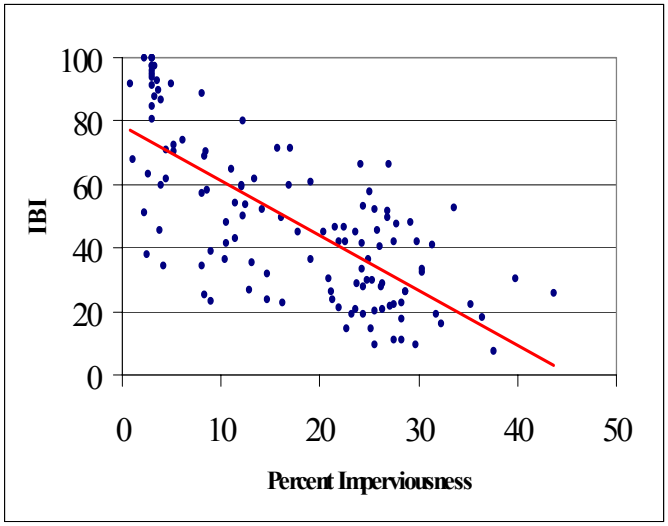


Figure I-6. Trend line indicating that Biological integrity, as measured by an Index of Biotic Intetrity (IBI) for benthic macroinvertebrates, generally decreases with increasing percent imperviousness. Source: Fairfax County Department of Public Works and Environmental Services, *Fairfax County Stream Protection Strategy, Baseline Study*, January, 2001.

### iv. Management Strategies

Based on overall stream rankings and projected development within each watershed, three management categories were established to provide recommendations for future efforts:

1) Watershed Protection – Watersheds in this category will be areas with low development density and which currently possess streams with biological communities that are relatively healthy and have a composite ranking of Good or Excellent. The primary goal of this category is to preserve biological integrity by taking active measures to identify and protect, as much as possible, the conditions responsible for the current high-quality ratings of these streams.

2) Watershed Restoration Level I- Watersheds in this category have a composite rating of Fair or, rarely, Poor and a projected imperviousness of less than 20%. The primary goal of this category is to re-establish healthy biological communities by taking active measures to identify and remedy causes of stream degradation, both broad scale and site-specific.

3) Watershed Restoration Level II –Watersheds here have a composite rating of Poor, Very Poor or, rarely, Fair and a projected imperviousness of greater

than 20%. This category will likely be categorized by high development density and significantly degraded stream segments. The primary goal is to prevent further degradation and to take active measures to comply with Chesapeake Bay initiatives.

The report is online at:
http://www.co.fairfax.va.us/gov/dpw/spss/homepage.htm

**b. Volunteer Water Quality Monitoring Programs**

i. Northern Virginia Soil and Water Conservation District (NVSWCD)

The Northern Virginia Soil and Water Conservation District (NVSWCD) manages a water quality monitoring program in Fairfax County, which is conducted by qualified volunteers. The program includes training and certification of monitors, data management and analysis, and quality control. Four times a year, volunteers conduct a biological assessment, using the Save Our Streams protocol. They determine the general quality of the water by evaluating the type and diversity of aquatic macroinvertebrates. They also record their observations of the surrounding watershed, including land uses, the amount of streamside and stream bank vegetation, tree canopy, and signs of erosion and other pollution. The monitors conduct water chemistry tests for temperature, turbidity, and nitrates to assess the water quality. In 2000, 12 sites reported winter data, 20 reported in the spring, 39 in the summer and 39 in the fall.

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ii. Audubon Naturalist Society (ANS)

ANS also manages a volunteer water quality monitoring program in the region that currently includes 35 monitors, with an average of four monitors for each of the eight sites in Fairfax County. Two sites are in E. C. Lawrence Park and are monitored by Park staff. The ANS program uses a modified version of the Environmental Protection Agency's (EPA's) Rapid Bioassessment II protocol, which includes assessment of in-stream and streamside habitat parameters and a survey of benthic macroinvertebrate populations. There are three required monitoring sessions (May, July, and September) and an optional winter monitoring session between December and February. ANS staff performs data entry and quality control activities. ANS also furnishes all monitoring equipment and training. Monitor training includes macroinvertebrate identification (order and family level), protocol practicum, habitat assessment, and benthic macroinvertebrate adaptations. Monitors are recruited in semi-annual introductory workshops. The water quality monitoring program is part of a larger watershed awareness program that includes slide show and video presentations, watershed walks, and other presentations.

iii. Fairfax County Park Authority

Park Authority staff members have, at several County park sites, worked with citizens on stream monitoring projects. Long-term data are being collected at established monitoring points through efforts that are being coordinated at three nature centers and at Lake Accotink Park. The Park Authority has also recruited a volunteer to act as a Stream Cleanup Coordinator. This individual will work to organize stream clean-up events in non-staffed stream valley parks.

## 2. Fairfax County Health Department Water Quality Report

The Division of Environmental Health in the County Health Department produces the other comprehensive review of Fairfax County streams. In 2000, data were collected from 85 sampling sites throughout 25 of 30 watersheds in Fairfax County. A total of 1,277 stream samples were collected for analysis.

Twenty-three site visits were made by the Health Department to investigate 13 stream complaints in 2000. Four dealt with dumping and trash in streams and nine with color and odor. Two of the complaints required action to be taken by the Fairfax County Health Department and on required action by the Fire Marshall's office.

The report is online at http//www.co.fairfax.va.us/service/hd/strannualrpt.htm.

### a. Fecal Coliform

These bacterial organisms are found in the intestinal tracts of warm-blooded animals including humans, and therefore can be indicative of fecal contamination and the possible presence of a pathogenic organism. In surface waters, fecal coliform (F.C.) bacteria should not exceed 200 fecal coliform bacteria per 100 ml of water.

–In the watersheds tested, Fairfax County streams met the standards of < 200 F.C./100 ml (considered GOOD) 14% of the time. Several streams had readings exceeding 1,000 F.C./100 ml.

Because of excessive and persistently high coliform counts in Accotink Creek, a TMDL (Total Maximum Daily Load) is underway. See the description below in the section entitled “Special Stream Reports and Programs.”

### b. Dissolved Oxygen

The presence of dissolved oxygen (D.O.) is essential for aquatic life, and the type of aquatic community is dependent to a large extent on the concentration of dissolved

oxygen present. Dissolved oxygen standards are established to ensure the growth and propagation of aquatic ecosystems. The minimum standard for dissolved oxygen is 4.0 mg/l.

–Ninety-nine percent (99%) of the samples collected for determination of D.O. were above the 4.0 mg/l range. The Mill Branch sampling station showed readings below 4.0 only 50% of the time (two out of four samples collected). This sampling site is located downstream from a debris landfill and could indicate that organic contaminants are entering the stream. This site has been dropped from the sampling schedule after four samples were collected in 2000 and it was determined that the amount of available water to sample was insufficient for proper evaluation. This sampling site is monitored by Virginia's Department of Environmental Quality.

**c. Nitrate Nitrogen**

Nitrate nitrogen is usually the most prevalent form of nitrogen in water because it is the end product of aerobic decomposition of organic nitrogen. Nitrate from natural sources is attributed to the oxidation of nitrogen in the air by bacteria and to the decomposition of organic material in the soil. Fertilizers may add nitrate directly to water resources. Deposition of nitrogen compounds from air pollution also occurs. Nitrate concentrations can range from a few tenths to several hundred milligrams per liter. In non-polluted water, they seldom exceed 10 mg/l. Nitrate is a major component of human and animal wastes, and abnormally high concentrations suggest pollution from these sources.

–The samples for nitrate nitrogen ranged from a low of 0.09 mg/l to a high of 13.4 mg/l. The overall nitrate nitrogen geometric mean was 0.6 mg/l, well below the maximum limit of 10 mg/l. Three samples taken (in November and December) in the Old Mill Branch watershed at Station 25-4 were above the maximum contamination level of 10 mg/l.

**d. Phosphorus (Total)**

Phosphorus is found in natural water in the form of various types of phosphates. Organic phosphates are formed in the natural biological process--by organisms existing in the water, contributed to sewage in body wastes and food residues, and/or formed in the biological treatment process for sewage. Condensed phosphates and orthophosphates are found in treated wastewater, laundry detergent, commercial cleansing compounds, and fertilizers. Phosphorus is essential to the growth of organisms and is usually the nutrient that limits growth of organisms in a body of water. Therefore, the discharge of raw or treated sewage, agricultural drainage, or certain industrial wastes may stimulate nuisance quantities of photosynthetic aquatic organisms and bacteria.

–There is no established limit for phosphorus in stream water. This year's geometric mean of 0.10 mg/l does not indicate a significant increase over prior years' averages

**e. Temperature**

The existence and composition of an aquatic community also depends greatly on the temperature characteristics of a body of water. The maximum standard for free flowing streams is 89.9$^{o}$ F (32$^{o}$ C).

–The temperature range for all stream water samples collected in 2000 was 32$^{o}$ F for the low in December and 80$^{o}$ F for the high in August. The average temperature was 54$^{o}$ F and this reflected a slight downward trend in the water temperature of the samples collected over the last twelve years.

**f. Heavy Metal and Toxins**

The presence of heavy metals in stream water indicates possible discharge of household and industrial waste into streams. Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver are monitored for based on their occurrence in industrial and household waste, their potential health hazards, and as part of the Virginia Department of Environmental Quality water requirements.

–All results are within normal limits.

**g. pH**

Stream pH is an important factor in aquatic systems. The pH range of 6.0 - 8.5 generally provides adequate protection of aquatic life and for recreation use of streams.

–The pH ranged from a low reading of 4.1 to a high of 10.7. Eight samples were above the 8.5 limit and six samples were below the 6.0 limit. Follow up testing indicated normal pH.

**h. Summary**

The average geometric mean for fecal coliform bacteria at several of the stream sample sites is approaching and surpasses 1,000 F.C./100 ml. (This is definitely not in the good range). The chemical and physical parameters have remained constant over the past five years. Therefore, the Health Department considers the overall water quality of Fairfax County watersheds fair for fecal coliform bacteria and good for chemical and physical parameters.

The Health Department ends its Water Quality Summary statement with the following caveat:

> "In summary, any open, unprotected body of water is subject to pollution from indiscriminate dumping of litter and waste products, sewer line breaks and contamination from runoff pesticides, herbicides, and waste from domestic and wildlife animals. Therefore, the use of streams for contact recreational purposes, such as swimming, wading, etc. which could cause ingestion of stream water or possible contamination of an open wound by stream water, should be avoided."

## 3. Health Department Volunteer Monitoring Program (Adopt-A-Stream)

This program, which is administered by the Environmental Services Section of the Health Department, was initiated in 1989 in response to a recommendation of the County's Environmental Quality Advisory Council. Its objective is to make people aware of stream pollution issues and to establish a network for reporting pollution incidents. At present, 95 groups, representing more than 500 individuals, participate in the program. DPWES uses information from the Adopt-A-Stream program to help identify pollution sources.

## 4. Virginia Department of Environmental Quality (DEQ)

The Virginia Department of Environmental Quality maintains 16 sites in Fairfax County: Accotink Creek (three sites), Cub Run, Difficult Run (two sites), Dogue Creek, Occoquan River (two sites), Pimmit Run, Popes Head Creek, Pohick Bay (three sites), Sugarland Run, and Mills Branch. The data list sources of types of runoff, and for three of the streams, the reason for their placement on Virginia's list of impaired waters (the "303(d) list").

## 5. Special Stream Reports and Programs

### a. Accotink Creek TMDL (Total Maximum Daily Load)

Due to excessive fecal coliform bacteria counts, a 4.5 mile segment of Accotink Creek in Fairfax County, beginning at the confluence of Crook Branch and Accotink Creek to the start of Lake Accotink, was placed on the 1998 Virginia 303(d) TMDL list. A TMDL is a highly structured watershed-specific plan for bringing an impaired body of water into compliance with the Clean Water Act goals. A two-year study began in December, 1998, headed by the U.S. Geological Survey, in partnership with the Virginia Department of Conservation and Recreation (DCR), the Virginia DEQ, and Fairfax County. The sample collection

and analysis, which began in April 1999, to determine the "type" of fecal coliform found in streams is now complete. Preliminary results indicate the source of bacteria are distributed as follows; 40% waterfowl, 20% human, 13% dogs, 5.4% raccoon, 1.4% deer, and 21% other. A proposed solution and a source reduction implementation schedule are required.

### b. Four Mile Run TMDL and the Four Mile Run Program

Although only the very upper reaches of Four Mile Run occur in Fairfax County, it is important to note the existence of a TMDL for Four Mile Run and the participation of Fairfax County in the Four Mile Run Program.

The Four Mile Run Program is the oldest continually active program of the Northern Virginia Regional Commission (NVRC). The four jurisdictions (Arlington County, Fairfax County, the City of Falls Church and City of Alexandria) through which Four Mile Run flows are involved in the program. The program was founded in 1977 to ensure that future development would not result in increased flooding in the watershed. Today, all development and redevelopment is analyzed through the Four Mile Run Computer Model to determine whether on-site detention of stormwater is necessary to prevent downstream flooding. In 1998, the Four Mile Run Agreement was amended to address urban water quality issues in addition to flooding.

The Four Mile Run Fecal Coliform Study to determine the sources of fecal coliform in the watershed using DNA was completed in 2000. The study found that waterfowl contribute over one-third (37%) of that bacteria that could be matched; humans and dogs combined contribute 26%, and raccoons contribute 15%. Bacteria from humans appear to be highly localized. Significantly, the study found that without regard to specific host animals, E. coli bacteria seem to regrow, through cloning, within the storm drains and stream sediments, which in turn perpetuates bacteria levels.

NVRC has received funding from the Virginia DEQ to develop a TMDL for bacteria in Four Mile Run by May 2002.

### c. Kingstowne Stream Restoration Project

In 1998, Fairfax County, the Northern Virginia Soil and Water Conservation District, the U.S. Natural Resources Conservation Service, and two citizens groups (the Friends of Huntley Meadows and the Citizens Alliance to Save Huntley) formed a partnership to restore a stream that is located in the Kingstowne community. This stream is a tributary of Dogue Creek and is upstream of Huntley Meadows Park. Started in October and finished by December 1999, the

Kingstowne Stream Restoration Project is now functional. The project used principles of geomorphology and soil bioengineering to create gentle meanders that slow the velocity of flow and natural vegetation to stabilize the stream banks. Testing has substantiated that erosion has been brought under control and water quality downstream is improved.

With respect to the Kingstowne Monitoring program (to assess the adequacy of erosion and sediment controls installed on developing sites in the Kingstowne community), between January and December 2000, 19 storm event samples and 12 base flow samples were collected and analyzed to determine pollutant loads in Dogue Creek. Based on the monitoring data, the 85% sediment removal efficiency was achieved for all storm events. Therefore no stop work orders were issued to the developer during the year 2000.

# D. PONDS AND LAKES

All ponds and lakes in Fairfax County are man-made by excavation and/or the damming of streams. These open water impoundments are their own communities and have many of the same organisms as streams. Most provide recreational opportunities for humans. Due to increased runoff in more urbanized areas, they are often subject to heavy sediment and nutrient loads. Heavy sedimentation means that most of the lakes have to be dredged on a regular basis in order to maintain pond or lake depth. Heavy nutrient loads result in large algal and plant blooms over the warmer months of the year.

Reston has several large lakes (Lake Newport, Lake Anne, Lake Thoreau, and Lake Audubon) that are managed by the Reston Association and are monitored for algae growth and sedimentation.

The six Pohick watershed lakes (Barton, Braddock, Huntsman, Mercer, Royal and Woodglen) are inspected annually for dam structure but are not monitored for biological or chemical parameters.

The Lake Barcroft Watershed Improvement District (WID) is a local taxing district authorized by Virginia Law for conservation purposes. In 1999, Lake Barcroft had about 15,000 cubic yards of dredge spoil from the lake to dispose of. In order to avoid the costs associated with hauling it to a landfill, they rented a huge topsoil screening machine and excavator to load it, converting the waste material into topsoil by filtering out all the sticks, stones, beverage cans and other debris. The topsoil was then made available to local residents for a modest delivery fee. Some innovative BMPs (Best Management Practices), such as flow regulators, check dams, a diversion debris trap, a stormwater injection pit, and a street sweeping program have been implemented by the WID. These BMPs are being studied for both their capacity to reduce pollution and improving water quality in the lake

and its tributaries, possibly leading to Countywide implementation. The WID also has a program to purchase and distribute high quality lawn fertilizer in 50-pound bags (the fertilizer has been formulated without phosphorus) and to sell the fertilizer to homeowners.

Lake Accotink is owned and managed by the Fairfax County Park Authority. County government has recently authorized the expenditure of $6,000,000 to dredge and remove 200,000 cubic yards of sediment from the lake. There are other significantly sized lakes within the County. Many are centered within developments and have dwellings built along the banks of the lakes. There are numerous smaller ponds throughout the County that are found within communities or commercial developments. Some are associated with golf courses and many serve as stormwater management ponds.

# E. STORMWATER MANAGEMENT AND SOIL AND EROSION CONTROL

## 1. Status of Stormwater Utility (Environmental Stormwater Utility) Concept in Fairfax County

In December of 1998, a draft report by the Stormwater Utility Advisory Group (SUAG) to the Board of Supervisors was circulated for review. The report addressed several issues relating to the implementation of a stormwater service charge program for Fairfax County. Activities were suspended leading up to the fall 1999 Board of Supervisors elections. DPWES is evaluating the need to conduct a more comprehensive public information campaign to articulate need and gain wider public support. During the summer of 1999, the firm of Camp, Dresser and McKee (CDM) was requested to develop a concept paper/report on framing significant aspects of the County's existing stormwater control program and present ideas and recommendations on the essential elements of future stormwater program. CDM submitted a draft report in December of 1999. A final edition was completed by March 2000. Work on public outreach is proceeding but any further action awaits full funding and the implementation of the stormwater utility fee program by the County.

## 2. Status of NPDES Requirements

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit was issued by the Virginia DEQ with an effective date of January 24, 1997. This is a Phase I (five year) permit and will end in 2002. A Phase II permit will then be issued which will be under new Federal guidelines. TMDLs will be tied into the new permit. In March, 2000, the 1999 Annual MS4 Report was submitted and accepted by the Virginia DEQ.

The present Permit terms basically require the County to continue with its present stormwater management program. This includes, among other things, efforts to construct and maintain ponds and other types of water quality and peak shaving facilities. The Maintenance and Stormwater Management Division of DPWES will perform inspection of privately owned stormwater management facilities on a regular basis (every five years). Water quality will be monitored at six storm sewer outfalls four times a year (seasonally), and 100 outfalls per year will be monitored during dry weather to determine the presence of illicit discharges.

During 2000, the County continued to evaluate BMPs (best management practices), undertook several stream restoration projects, continued with the monitoring of six wet weather and 105 dry weather outfalls, and inspected 1,411 stormwater control facilities.

## 3. Regional Stormwater Management Program

### a. Background

Since the early 1980s, the County's *Public Facilities Manual* (PFM) has included a provision that encourages the concept of regional stormwater management. As opportunities arose, major developers as well as County staff pursued regional stormwater management primarily through the development process. An overall plan identifying the most appropriate locations for regional facilities was needed to improve this process.

In January 1989, the Board of Supervisors adopted a plan prepared by the engineering firm of Camp, Dresser and McKee. The plan, intended to be a pilot program, consists of a network of 134 detention facilities that will directly control 35 square miles of drainage area. To date, over 45 regional ponds in the Regional Stormwater Management Plan have been constructed. Currently there are 25 facilities in various stages of implementation. Fifteen potential facilities are in the final design phase either as County managed projects or via developers through rezoning. Ten potential facilities are in the preliminary design phase.

### b. Creation of new Stormwater Planning Division (SWPD)

Created in February 2000 by the Director of DPWES after approval by the Board of Supervisors, this new division is to review current countywide policies affecting the ecosystem and stormwater management issues. SWPD is to promote policies to improve and protect the quality of life and support the environmental goals of the County.

**c. Changes in County Mowing Policy at Stormwater Management Ponds**

During the summer of 2000, in support of the interim tree policy adopted by the Board of Supervisors in 1999, the County revised its pond-mowing program. The interim tree policy provides opportunities for planting trees beyond the areas currently allowed under the Public Facilities Manual. The mowing program reduces the area mowed in and around a stormwater management pond by an average of 60% per pond. This program has resulted in the planting of 15 ponds with additional pond plantings under consideration by adjacent homeowners.

**d. Publication of "Maintaining BMP's- A Guidebook for Private Owners and Operators in Northern Virginia"**

Published in February 2000 by the Northern Virginia Regional Commission, the guidebook specifically targets homeowners/civic associations and small businesses that may have responsibility for BMP maintenance. The guidebook addresses simple maintenance tasks, how to plan for long-term BMP maintenance costs, and where to go for additional information.

**e. Stormwater Management Seminar**

On April 26, 2000, the Northern Virginia Soil and Water Conservation District held an all day meeting at the County Government Center to address several issues:

1) Public support for a dedicated funding source for a stormwater utility fee;
2) Upgrades, repairs and retrofits of existing stormwater facilities; and
3) Protection and restoration of damaged streams.

The sessions, designed to assess the current state of stormwater management and ways in which it can be improved, were attended by 230 people from County government, the building industry, homeowner and citizen associations, and environmental groups.

## 4. Infill and Residential Development Study

The combination of development patterns in the County and a growing concern over water quality issues led to a May 1999 request from the Board of Supervisors for the "Infill and Residential Development Study". The study was completed in 2000 and released to the public. The Board of Supervisors accepted the final recommendations at a public hearing January 22, 2001. The Study staff have reviewed the effectiveness of current policies regarding erosion and sediment (E&S) control and storm drainage with the dual goal of minimizing any impacts of stormwater from a proposed

development on downstream property and limiting the impacts of stormwater management facilities on a neighborhood.

Recommendations of the study include:

- An enhanced erosion and sediment control program, including the revoking of land disturbing permits during egregious violations;
- Allowance of the use of chemical erosion prevention products, and bonded fiber matrix on highly sensitive soils or on steep slopes;
- Adoption of innovative BMPs;
- Amendment of the Public Facilities Manual to include Super Silt Fence requirements, Storm Drain Inlet Protection Devices, and Faircloth Skimmers;
- Improved requirements for early review of stormwater management facilities as part of the rezoning process;
- Improved requirements for evaluating the adequacy of stream channels for increased runoff due to new developments;
- Development of a BMP monitoring program; and
- Enhancement of education programs for citizens, staff, and industry regarding E&S control importance and creation of an E&S Hotline.

# F. NONPOINT SOURCE POLLUTION PROGRAMS

## 1. Chesapeake Bay Program

Pursuant to the requirements of the Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulations, the Chesapeake Bay Local Assistance Board (CBLAB) has determined that Fairfax County's Comprehensive Plan is consistent with the Act and the Regulations, subject to a condition that the County amend its Comprehensive Plan such that the following will be accomplished:

- The provision of Chesapeake Bay Preservation Area maps somewhere within the Plan;

- The development of a shoreline erosion control inventory (characterizing rates of erosion along the County's tidal shoreline areas) and related policies and strategies that can be implemented through the Wetlands Board review process;

- The development of an inventory of existing and potential shoreline access sites, with a focus on boat-related facilities, and the consideration of one or more Plan policies establishing criteria for the siting of such facilities;

- The development of policies, where appropriate, that address water quality-related recommendations outlined in the Infill and Residential Development Study; and

- The development of an inventory of existing pollution sources and the development of policies, where appropriate, to address water quality improvement in redevelopment areas.

The activities listed above must be completed by December 31, 2003. It should be noted that many, if not all, of the above requirements can be incorporated into a supplement to the Comprehensive Plan (that can be referenced within the Plan), and that other jurisdictions have proceeded in this manner.

The agricultural portion of the Chesapeake Bay Preservation Ordinance requires landowners with land in agricultural uses to have conservation plans. The Northern Virginia Soil and Water Conservation District (NVSWCD) prepares soil and water quality conservation plans and provides technical assistance in the implementation of approved plans. NVSWCD has written plans for all Agricultural and Forestal Districts that have Resource Protection Areas within their limits. Currently, NVSWCD is working extensively with horse owners and keepers, since a large percentage of agricultural land use in Fairfax County is related to horse operations. These operations require innovative land management and careful nutrient management to prevent and reduce pollution in runoff to nearby streams. As of July, 2000, plans had been approved for more than 8,129 acres of land containing approximately 213,008 linear feet of Resource Protection Areas (100-foot vegetative buffers on either side of a stream). $64,000 had been paid to Fairfax County citizens who manage these horse operations to cost share the implementation of agricultural best management practices. It is estimated that 7,191 pounds of nitrogen and 838 pounds of phosphorus have been kept out of Fairfax County waterways as a result of these efforts.

In June, 2000, the Northern Virginia Regional Commission hosted a Better Site Design Workshop for Communities implementing Virginia's Chesapeake Bay Preservation Act. This workshop featured a roundtable of professionals to discuss impediments to implementing better site design principles. The workshop had 75 participants, many of whom were Fairfax County staff and appointed/elected officials.

## 2. Erosion and Sedimentation Control and Enforcement--Fairfax County Department of Public Works and Environmental Services

DPWES is planning the implementation of organizational improvements to the Environmental and Facilities Inspection Division (EFID, formerly the Site Inspection Branch) that will result in a greater emphasis and a higher quality of inspection services associated with erosion and sediment control. They will be developing a new quality assurance program and will be training Field Specialists (a newly established position).

Field Specialists will be responsible for resolving all erosion and sediment control violations. DPWES will be developing a prioritized inspection program, in accordance with guidelines established by the Virginia Department of Conservation and Recreation, that will consider slope, soil type, proximity to streams, and extents of buffer areas to determine an overall rating for any given site. These proposed resource requirements and organizational improvements are being led by the County's Environmental Coordinator.

**a. Inspections**

In 2000, the EFID recorded an average of 674 Erosion and Sediment (E&S) control inspections per month for over 1,200 major projects. Additionally, staff recorded an average of 280 E&S control inspections per month for over 1,275 minor projects. They also issued 27 Notice of Violations per month for violations of Chapter 104 of the *Fairfax County Code*.

Litigation against two of the upstream developers for off-site damages associated with land development activities has commenced and trial dates have been scheduled. In addition, the County has engaged the services of a consultant to prepare a plan to remove 6,100 cubic yards of sediment from Lake Martin. Additionally, plans to retrofit two upstream existing stormwater management ponds to protect stream channels that drain into Lake Martin have been drafted.

## 3. Occoquan Basin Nonpoint Pollution Management Program

The Northern Virginia Regional Commission continued in its role as staff to the Occoquan Basin Nonpoint Pollution Management Program. The program was established in 1982 to provide an institutional framework for maintaining acceptable levels of water quality in the Occoquan Reservoir, one of the two major sources of drinking water for much of Northern Virginia. With the release of the 2000 Census data, staff determined that there were approximately 363,000 people residing in the Occoquan watershed as of the year 2000. This represents a four-fold increase in population from when statistics were first collected in 1977. The Occoquan Program has initiated an update to its 1992 Northern Virginia BMP (Best Management Practice) Handbook. The main emphasis will be on the inclusion of previously innovative, but now accepted techniques such as rain gardens and some non-structural BMP techniques with demonstrated removal efficiencies. All Northern Virginia local governments have been contacted by staff soliciting representation to an *ad hoc* subcommittee that will be used to guide the process.

### 4. Soil and Water Conservation Technical Assistance

In calendar year 2000, NVSWCD:

- Reviewed and commented to DPWES on 71 site development plans regarding erosion and sediment controls;
- Provided assistance to other state and local government agencies (including the Virginia Department of Transportation) 36 times;
- Provided assistance to consultants, engineers and developers 182 times;
- Provided land management assistance to individual homeowners and associations 494 times (340 by office or phone visits, 154 by site visits);
- Provided assistance to pond owners/managers 37 times; and
- Provided assistance regarding rezoning applications to Department of Planning and Zoning 260 times.

### 5. Backyard to Bay Program

NVSWCD created and distributes the *Citizens Water Quality Handbook*, a practical guide to water quality, that contains chapters on watersheds, water conservation, nonpoint source pollution, stream management, wetlands protection, water quality monitoring, environmentally friendly lawn care, specific suggestions for "making a difference," and a listing of agencies and organizations that provide services, information, and help related to water quality. *Don't Dump Oil*, a Spanish language brochure, explains that dumping used oil into storm drains is not only illegal, but can harm people and the environment.

## G. WATER POLLUTION ENFORCEMENT ACTIONS

### 1. Virginia Department of Environmental Quality (DEQ)

DEQ reports that it had 68 Underground Storage Tank cases and 236 Pollution Response cases in Fairfax County in 2000.

# H. DRINKING WATER SUPPLY

The County's water supply comes from the Potomac River, the Occoquan Reservoir, Goose Creek, community wells, and private wells. The Fairfax County Water Authority (FCWA) also provides drinking water to the Prince William County Service Authority, Loudoun County Sanitation Authority, Virginia America Water Company (City of Alexandria and Dale City), Town of Herndon, Fort Belvoir, Dulles Airport, and Lorton Correctional Institution.

With the exception of some wells, prior to use the water must be treated. The County's water use decreased to 47.43 billion gallons in 2000. Table I-1 presents the 2000 sources of the County's water supply.

**Table I-1**
**Sources of Fairfax County's Water Supply, 2000**

| Sources | Gallons (in billions) |
|---|---|
| Occoquan Reservoir (Lorton/Occoquan) | 20.03 |
| Potomac (Corbalis) | 27.39 |
| Wells | 0.03 |
| Purchased | 0.05 |
| **TOTAL** | **47.43** |

Source: Fairfax County Water Authority

## 1. Wells

The five (5) FCWA wells and their two (2) distribution systems were monitored monthly for bacteriological quality and annually or semi-annually for Volatile Organic Compounds (VOCs). In 2000, the wells were tested semiannually for metals, nutrients, solids, odors, color, pH, alkalinity, and turbidity. During 2000, four of the six wells exceeded the Secondary Maximum Contaminant Level (SMCL) for odor and two for iron. These are non-enforceable limits relating to the aesthetic quality of drinking water.

During quarterly monitoring in 2000, four (4) wells showed trace levels of VOCs. The monitoring results on wells met the Virginia Department of Health (VDH) Water Works Regulations.

Lead and Copper monitoring in accordance with EPA and VDH Waterworks Regulation was performed on one (1) distribution system in 2000. The system met all regulatory requirements. The corrosion control program for this well system was enhanced in 1999 through the addition of a pH adjuster to inhibit corrosion. Monitoring results have improved since that time.

## 2. Lorton and Corbalis Systems

### a. Trihalomethanes, Chloramines, and Other By-products of Water Treatment

Trihalomethanes are by-products of chlorination water treatment and are thought to be carcinogenic.

### b. Trihalomethanes (THM) Monitoring Project

The distribution system running quarterly averages were below the Maximum Contaminant Levels (MCL) for total trihalomethanes (TTHM) of 100 ug/L. The 2000 running quarterly averages for TTHMs were 34 ug/L and 50 ug/L for the Corbalis and Lorton distribution systems, respectively.

### c. Disinfectant/Disinfection By-products (D/DB-P) Rule

EPA has promulgated Stage I of the D/DB-P Rule, which lowers the total THM MCL from 100 ug/L to 80 ug/L. (TTHM - Total Haloacetic Acids, Bromate, and Chlorite and the Disinfectants, Chlorine, Chloramine, and Chlorine dioxide). The rule also sets a Maximum Residual Disinfectant Level (MRDL) for chlorine of 4 ug/L. FCWA is presently testing for these chemicals in the water treatment systems. To obtain lower TTHM (total THM) concentrations, the new facilities for ozonation are being constructed at the Corbalis and Lorton facility.

### d. Heavy Metals

FCWA tests drinking water quarterly for aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, magnesium, mercury, nickel, potassium, selenium, silver, thallium and zinc and on a monthly basis for iron, manganese and sodium. The levels of these metals continue to be below their MCL or SMCL. According to FCWA, "the concentration levels for the unregulated metals were within an expected range." During 2000, FCWA monitored 100 customer taps for lead and copper according to EPA regulations. FCWA met all EPA requirements for this rule.

### e. Enhanced Surface Water Treatment Rule (ESWTR)

The following summary is taken from information provided to EQAC from FCWA. According to FCWA, the ESWTR assumes that revisions to the current Surface Water Treatment Rule may be necessary to provide additional protection from pathogenic organisms. The first step toward developing the ESTWR was microbiological monitoring; one year of data has been used to develop requirements for an interim ESWTR. The long-term ESWTR will be based on additional data

collection and refinement of the interim ESWTR. The proposed ESWTR will provide for a sanitary survey of the entire system, a maximum contaminant level goal for cryptosporidium of zero, and treatment alternatives.

**f. Other Monitoring Programs**

During 2000, the FCWA Laboratory monitored the surface waters and finished drinking water for 42 Volatile Organic Compounds (VOC) and 39 Synthetic Organic Compounds (SOC). No VOCs were detected in source waters except for trace amounts of Methyl Tertiary Butyl Ether (MTBE), a non-regulated parameter. MTBE has been detectable in high amounts in source waters. The only VOCs detected in the finished water systems were TTHMs and trace amounts of MTBE. The few SOCs that were detected were detected in both the finished and source waters and were at trace levels significantly below the Maximum Contaminant Levels.

**g. Residuals Disposal**

Residuals occur as the result of heavy sediment loads entering the freshwater intakes and having to be removed from the water prior to treatment. Residuals generated at Corbalis are presently being applied by contract to agricultural lands in Maryland and Virginia. The FCWA is studying the possible use of polymers in lieu of lime in the dewatering process. If polymer condition dewatering becomes feasible, the solids volume for disposal may decrease.

**h. Consumer Confidence Reports**

Federal regulations require water suppliers to provide annual reports on the quality of the drinking water to their customers through the Consumer Confidence Report (CCR) Rule. FCWA customers received their first annual CCR in the summer of 1999. The 2000 CCR is available for review on the FCWA web site at http://www.fcwa.org.

**i. New Treatment Plant in Lorton**

The FCWA is building a new state-of–the–art 129 mgd (million gallons per day) water treatment plant, expandable to 160 mgd, to replace the existing Lorton and Occoquan treatment plants in Lorton. In addition to flocculation and sedimentation, the plant will include advanced treatment processes of ozone disinfection and biologically active, deep bed, GAC (granular activated carbon) filtration. The Raw Water Pumping Station associated with the new plant will also have a capacity of 120 mgd and be expandable to 160 mgd.

**j. Interstate Commission on the Potomac River Basin (ICPRB) Cooperative Water Supply Operations (CO-OP)**

The ICPRB plays several important roles in providing for the region's current and future water supply needs. The CO-OP Section facilitates the agreement among the three major water utilities (Fairfax County Water Authority is one) that require water suppliers to share resources during times of low flows in the Potomac River. The Water Resources Section also provides technical water resources management assistance to the jurisdictions throughout the basin.

**k. Metropolitan Washington Council of Governments (COG) Water Supply and Drought Awareness Response Plan**

In response to the droughts of 1998 and 1999, COG brought together a task force in May 2000 to coordinate regional responses to reduced availability of drinking water supplies during droughts. The plan consists of two components:

(1) a year round plan emphasizing wise water use and conservation; and
(2) a water supply and drought awareness and response plan.

The Interstate Commission on the Potomac River Basin handles the administration of the coordinated drought response for water withdrawals from the Potomac River and during low flows. Additionally, the CO-OP Section works with COG and the Drought Coordination Committee to assist in providing accurate and timely information to basin residents during low-flow conditions in the Potomac.

# I. NEW LAWS OR REGULATIONS

## 1. Chesapeake 2000: A Watershed Partnership

In June, 2000, the Governors of Maryland, Virginia, and Pennsylvania, the Mayor of the District of Columbia, the U.S. EPA Administrator, and the Chairman of the Chesapeake Bay Commission signed a new compact entitled "Chesapeake 2000: A Watershed Partnership." A goal of this agreement is to remove the Bay and its tidal tributaries from the federal list of impaired waters. This will require new water quality standards designed to protect and restore critical habitat for aquatic plants and animals, the development and attainment of nutrient and sediment load reduction targets, and the "capping" of nutrient and sediment loads to ensure that load reduction targets, once attained, will be maintained over time. Related goals of the Chesapeake 2000 agreement address: living resource protection and restoration; habitat protection and restoration; other water quality protection and restoration issues; land use; and stewardship and community engagement.

# J. AMENDMENT TO THE POLICY PLAN FOR WATER QUALITY PROTECTION

In recognition of the growing awareness of the impacts of land use decisions on water quality, the environmental subcommittee of the Planning Commission met for several months with County staff and EQAC beginning in June 1998. County staff proposed an amendment to the County's *Policy Plan* that is based largely on these discussions; the amendment was heard and accepted by the Board of Supervisors in October of 2000. This amendment places into the Fairfax County Policy Plan language that supports the protection of, and minimization of impacts of development and redevelopment to, streams.

# K. SUMMARY

Fairfax County streams and watersheds continue to be impacted by four basic problems.

First is the failure of comprehensive land use planning and site design over time to adequately incorporate watershed and stream protection requirements into their decisions and to consider the cumulative effects of land use decisions on Fairfax County's streams.

Secondly, at times, high levels of fecal coliform bacteria occur in specific streams throughout the County.

Thirdly, stormwater runoff and erosion continue to be the largest problems within Fairfax County streams. Most Fairfax County streams have increased stormwater runoff flows that exceed the capacity of their stream channels. This has created an ongoing erosion cycle that includes eroding stream banks, heavy sediment loads, and sedimented stream bottoms. This erosion cycle persists for years, if not decades, until the stream channel widens to accommodate the flow. This has resulted in erosion problems throughout the County on trail systems, homeowners' backyards, business' landscapes, and transportation infrastructure such as bridge abutments. In addition, these ongoing erosion patterns have resulted in numerous large and small ponds and lakes throughout the County having enormous sediment deposition, which then requires frequent maintenance and dredging to maintain depth. Sediment on stream bottoms results in reduced habitat and diversity, and compromises food webs within watersheds. Sediment also compromises the quality of, and increases the expense of, treating the drinking water within the Occoquan Reservoir. Poor land use planning, inadequate enforcement of soil and erosion laws, and inadequate stormwater management in past years has significantly contributed to these erosion problems. Only a few streams, such as those in E. C. Lawrence Park, remain undisturbed and excellent examples of healthy streams in Fairfax County.

Lastly, there is no one component of the Fairfax County government responsible for the

management and protection of the County's streams or environment. County stream assessment and control have been parceled out to various agencies. Conflicting results have sometimes occurred as stormwater management strategies and policies have sometimes resulted in degraded stream habitat.

However, the reformation of the Environmental Coordinating Committee under the Deputy County Executive and the work and guidance of the Environmental Coordinator have done much to move towards more coordinated efforts. It should also be added that the Fairfax County Stream Protection Strategy Baseline Assessment in 2000, the amendment to the Policy Plan to address stream protection that was passed in October 2000, and the recommendations of the Infill and Residential Development Study report (issued in 2000) pertaining to stormwater management and erosion and sediment control matters are significant first steps in addressing many of these issues. Fairfax County should be commended for the efforts that it is making to protect and restore local streams.

However, as long as the rate of stream degradation surpasses stream protection and restoration efforts in Fairfax County streams, the trend will continue to be a downward one.

# L. RECOMMENDATIONS

**1. EQAC strongly recommends implementation of a Comprehensive Countywide Stream Management Program.**

Fairfax County's stream and other water resources are a legacy to preserve and protect for today's citizens and future generations. The well conceived and well–done countywide stream assessment report was released in January 2001. This underlying scientific examination of existing stream conditions is being and should continue to be used to create a well-coordinated and well-planned effort to establish priorities to protect, restore, and monitor changes to these resources using watershed and sub-watershed based strategies. EQAC strongly endorses the work of the County Board and staff in these efforts.

Along with the new Stream Protection Strategy rankings and management recommendations, this strategy should also include:

a) Coordination of all water quality monitoring reports and ongoing assessments of existing watersheds, to include point and non-point sources, including amounts of impervious surface and vegetative cover;

b) Maintenance and inspection of County BMPs at the highest level; and

c) Provision of funding at a level that is adequate to create and implement a fully functional stream protection program.

**2. EQAC recommends the funding of the Stormwater Utility Program/Watershed**

**Protection and Restoration Program.**

This program should include the following conditions:

a) Equal importance devoted to environmental protection, restoration, and monitoring as compared to infrastructure improvement and maintenance;

b) Establishment of a Watershed Board to oversee such a program and to ensure that the above conditions are met; and

c) Implementation of this should follow the recommendations of the Forested Wetlands Committee, which includes a careful examination of each site to ensure that disturbances to wetlands and other unique environmental features are minimized. It should also include structures and practices that allow bioretention and recharge to aquatic systems.

**3. EQAC recommends that the County initiate a study as to the sources of fecal coliform bacteria in Fairfax County streams within 12 months and subsequently implement a plan to address the sources of actual threats to public health.**

County streams have continued to show high coliform bacteria counts. Total Maximum Daily Loads (TMDLs) for coliform bacteria have been developed for Accotink Creek and Four Mile Run due to excessive coliform bacteria counts. The sources of the pollution have been identified and steps need to be taken to remediate the problem. While not the only or largest source of fecal coliform bacteria pollution, human fecal coliform bacteria were present in significant amounts in the two streams being tested and remain a point of concern. Until such a time as remediation is made, EQAC recommends a broad and aggressive public education program to include such things as posting signs, working with schools to provide "Safe Summer Tips," preparing news releases, working with homeowner associations, and publishing information in the *Weekly Agenda* and on the County's web page. Any posted signs should contain the following from the 1999 Health Department report: *"The use of streams for contact recreational purposes, such as swimming, wading, etc. which could cause the ingestion of stream water or possible contamination of an open wound by stream water, should be avoided."*

**4. EQAC recommends countywide monitoring to collect data on the efficiency of stormwater management ponds, other BMPs, and the effectiveness of required erosion and sediment control procedures, structures, and enforcement efforts. EQAC further recommends the monitoring of streams prior to and after the issuance of stormwater waivers and special exceptions to see the impact on County streams.**

While the Health Department Report and the Stream Protection Strategy Baseline Study (DPWES) indicate that Fairfax County streams have varying degrees of degradation, the specific causes are unclear. As a result, we cannot be certain as to which structures and

requirements are effective and working well in what conditions in Fairfax County. Until more data are collected, the continued granting of stormwater waivers and special exceptions should be limited as per EQAC's "Resolution Regarding Stormwater and BMP Waivers" dated July 11, 2001 (See Appendix A).

**5. EQAC recommends an accounting of all costs that the County and private individuals and entities spend to counter the effects of siltation and erosion in County streams.**

Reston Association, Lake Barcroft, the Fairfax County Park Authority, and private citizen groups are spending millions of dollars to dredge and maintain lakes in Fairfax County. Other money is spent to deal with countless stream bank erosion problems throughout the County. Siltation and runoff are cited by the Fairfax County Water Authority as one of the major reasons for a mid-river intake in the Potomac River. Fairfax County needs to assess the cost of NOT moving forward with an overall watershed protection and stream bank stabilization program.

**6. Given the apparent increase in construction activity, EQAC commends the County for additional inspectors and training to handle construction site inspection responsibilities.**

EQAC recommends that the County government continue to monitor complaints to determine if the strengthened inspection function results in a decline in number of complaints and violations. EQAC further recommends that the County consider training citizens in preliminary visual inspections to supplement and augment the efforts of County staff. EQAC commends the Board of Supervisors for fully implementing recommendations of the County Executive with the hiring of ten additional inspectors and the provision of additional training.

# LIST OF REFERENCES

*1999 Stream Water Quality Report, Division of Environmental Health, Fairfax County Health Department*

Bacteria Source Tracking and TMDL Development in Accotink Creek, Douglas Moyer & Kenneth Hyer, U.S. Geological Survey, Richmond, VA

Department of Environmental Programs, Metropolitan Council of Governments, response to EQAC request for information, Jim Shell, Principal Water Resources Planner, June 28, 2001

Estimating Nonpoint Fecal Coliform Sources in Northern Virginia's Four Mile Run Watershed. George Simmons, Donald Way, Sue Herbein, Sharon Myers and Ellen Walker

Fairfax County Agency Reports, Anthony Griffin, County Executive, March 13, 2001

Fairfax County Maintenance and Stormwater Management Division response to EQAC Request for information, Steve W. Aitcheson, Deputy Director, May 1, 2001

Fairfax County Office of Site Development Services Report, Department of Public Works and Environmental Services, Michelle Brickner, Director, July 19, 2001

Fairfax County Park Authority, Resource Management, Response to Request for information, Lee Stephenson, Division Director, May 24, 2001

Fairfax County Stream Protection Strategy Program Reports, December, 2000 and January 2001

Fairfax County Water Authority Report- report dated May, 2000

*Health Department Response to EQAC, February 14, 2000*

Infill & Residential Development Study, 2000, Department of Planning and Zoning, Department of Public Works and Environmental Services, Department of Transportation

Lake Barcroft Watershed Improvement District letter and reports, Stuart Finley, Director of Operations, May 8, 2001

Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System, Washington Council of Governments Board Task Force on Regional Water Supply, June 20, 2000

Northern Virginia Regional Commission Activities Update, Environmental Services, Northern Virginia Regional Commission Report, David Bulova, May 25, 2001

Report from Cliff Fairweather, ANS Water Quality Coordinator, September 14, 2001

Review of Fairfax County's Comprehensive Plan by the Chesapeake Bay Local Assistance Department (Memorandum to the Board of Supervisors), James Zook, Department of Planning and Zoning, January 30, 2001

Stormwater Planning Division, DPWES Response to EQAC request, May, 2001

Virginia Department of Environmental Quality Response and Data on Water Issues, Charlie Forbes, Assistant Division Director, Permitting and Water Resource Development, July 3, 2001

2000 Annual MS4 (Multiple Separate Storm Sewer System) Report for Fairfax County

# OTHER DATA

Data from the US Geological Survey Report on Aquatic Vegetation in the Potomac 2000, Nancy Rybicki, and the 2000 Potomac Aquatic Plant Control Program Summary Report, (Potomac Aquatic Plant Management Committee, Washington Council of Governments, June 25, 2001) will be incorporated into a new Potomac section in the 2002 Annual Report on the Environment.

Data from Occoquan Watershed Monitoring Laboratory were not made available for this report.

**CHAPTER II**

# AIR QUALITY

# II. AIR QUALITY

## A. ISSUES AND OVERVIEW

### 1. Introduction

Although air quality in Fairfax County continues to improve, the difficulties of air quality management in a tough regulatory environment are becoming all too clear. We continue to struggle with the reality of being part of a metropolitan ozone non-attainment area (an area that fails to meet the National Ambient Air Quality Standard (NAAQS) for ozone). While some of the uncertainties of litigation that were pending last year have now been resolved, the offsetting effects of those results combined with the advent of new litigation challenging the Environmental Protection Agency (EPA) decision to approve a requested extension of the Washington Metropolitan Area attainment date have not made our regulatory future look any more certain. Meanwhile the lack of some key air quality planning capabilities will continue to expose the County to an even more uncertain regulatory future.

**a. NOx SIP Call (litigation)**

In March of 2001, the U.S. Supreme Court rejected industry petitions appeal of the June, 2000 decision of the U.S. District Court of Appeals for the District of Columbia upholding the NOx (oxides of nitrogen) SIP (State Implementation Plan) Call issued earlier in the year by the EPA. The result of this is that the SIP Call can go forward with the further result that Northern Virginia should be able to take credit for ozone nonattainment that can be traced to transported NOx. This will not be without some potential difficulty within the state of Virginia, however, since our gains will have to come at the expense of upwind stationary sources of NOx elsewhere in the state.

**b. Rejection of Ozone Eight-Hour and Particulate Matter Standards (litigation)**

In February of 2001, the U.S. Supreme court largely upheld EPA's position in the face of industry challenges to the to the new ozone eight-hour and particulate matter standards. In the face of these court decisions, EPA struggles with the difficulties of moving toward implementation of these new standards. In Fairfax County, this will be more of an issue as we move away from the one-hour and toward the eight-hour standard. Meanwhile, although there were fewer exceedances in 2000, the County failed once again to see the year through without violations of both the one-hour and eight-hour standards.

**c. Phase II Attainment (Rate of Progress Planning) in Northern Virginia**

The Clean Air Act Amendments of 1990 required additional air quality management restrictions in Northern Virginia and culminated in approval of an additional 9% reduction (The Phase I Attainment Plan) by the Metropolitan Washington Air Quality Committee ("MWAQC"), which is the entity responsible for air quality planning for Fairfax County. The purpose of the Phase II Attainment Plan is to evaluate whether the measures included in the 9% plan are adequate to reach attainment in the Washington Metropolitan Area. In turn, the Phase II Attainment Plan has to be reflected in SIP planning activities in the State of Virginia. Although the favorable resolution of the NOx SIP Call litigation means that we should be able to project compliance with the one-hour ozone standard under the Phase II Attainment Plan, the transition to an eight-hour standard complicates this situation.

**d. Earthjustice Legal Defense Fund Lawsuit (litigation)**

As time passes, the relevance of the Phase II Planning exercise is apparently diminishing. In February 2001, the Earthjustice Legal Defense Fund, on behalf of the Sierra Club, filed suit against the EPA in the U.S. Court of Appeals for the D.C. Circuit as well as in the 4$^{th}$ Circuit in Richmond for approving an extension of the Washington Metropolitan Area attainment deadline until 2005. The EPA decision to grant that extension had been based largely on the projected effects of NOx transport into the Washington area and was consistent with the results of the NOx SIP Call.

Meanwhile the ongoing failure to monitor actual attainment of either the one-hour or the eight-hour ozone standard largely undercuts the assumptions that derive from Phase II planning. If the Earthjustice Legal Defense Fund lawsuit is successful, the results could be far-reaching for Fairfax County. Among other things, it would almost certainly result in a bump up in our nonattainment classification status from 'serious' to 'severe' with resulting additional air quality management requirements. It would also more than likely trigger legal requirements restricting highway planning flexibility and imposing further mass transit requirements or other actions offsetting growth in the use of motor vehicles.

**e. Periodic Emissions Inventory Update**

The periodic emissions inventory update which is due to the EPA in November of 2001 is likely to be delayed because of the failure of the EPA to complete its latest mobile source emissions model in a timely manner. The Mobile VI Model had originally been scheduled to be available in March of this year, although that has apparently not occurred. The failure to be able to correctly model for mobile source emissions is particularly problematic in Fairfax County because of the controversy surrounding emission levels of vehicles in the County.

### f. The Rise of Conformity

The purpose of conformity is to assure that planning for transportation activities is consistent with air quality management goals. In non-attainment areas such as the Metropolitan Washington Area, transportation planning cannot be allowed to proceed if: (1) it contributes to the creation of new air quality violations; (2) it contributes to the worsening of existing air quality violations; or (3) it delays the attainment of ambient air quality standards. The MWAQC, in consultation with the Transportation Planning Board ("TPB"), has the responsibility to establish the limits for mobile source emissions that apply to SIP development activities affecting Fairfax County.

In the Washington Metropolitan Area, the Transportation Planning Board is currently the key to conformity planning. Earlier this year, the TPB released its proposed conformity analysis for public comment; it is scheduled to take final action on the current conformity analysis before the end of the year. It should be no surprise, however, that the problem that is plaguing the conformity analysis is NOx. As a result of the current state of the mobile emissions inventory, the present conformity analysis demonstrates an exceedance of our daily NOx inventory by eight (8) tons per day. As a result of the dilemma this presents, the TPB has established a special conformity task force that has been meeting with the purpose of trying to determine how to address this problem. This is a particularly difficult situation given the lawsuit by the Earthjustice Legal Defense League. Although the EPA is defending the lawsuit, COG has apparently sought to intervene in the case in support of the EPA. Meanwhile the County is, at this stage, just a bystander. The County has apparently been part of the deliberations at MWAQC and also with the TPB and the task force.

As we stated last year, although we are at the relatively early stages of conformity analysis in Metropolitan Washington, other metropolitan non-attainment areas on the East Coast have recently had to face lawsuits claiming adverse air quality effects from highway expansion. There is increasing evidence that these types of activities are likely to become major components in the anti-sprawl strategy of national environmental groups. Depending upon what happens with conformity analysis in the Washington area, there is an increasing possibility that current road construction activities could be abruptly halted through denial of funding for federal projects and "regionally significant" state projects.

## 2. Air Quality Status in Northern Virginia

### a. Ground-level Ozone

The Metropolitan Washington, D.C. area, which includes Fairfax County, is classified as a serious nonattainment area for ozone. For all other Federal Air Quality standards, the area is in attainment. Since the region again failed to attain the one-hour ozone standard in 2000, it remains at risk of being bumped up from a serious to a severe non-attainment area.

### b. Ozone Exceedances in 2000

Attainment of the ozone standard in the Metropolitan Washington, D.C. area will require three years with no ozone exceedances. An exceedant day is one when an ozone-monitoring site exceeds the NAAQS of 0.12 ppm for at least one hour. In 2000 there were two ozone exceedant days in the metropolitan air quality region, with one exceedant day in Fairfax County. On that day (June 10, 2000) air quality at the Mount Vernon, Virginia monitoring station exceeded the standard. 2000 ozone exceedances for the region are shown in Table II-1.

### c. Air Quality Trends in Fairfax County

Although air quality in Fairfax County is improving, there would appear to be a good likelihood that marginal violations of the ozone standard will continue. This would especially appear to be the case given the current status and expected implementation of the eight-hour ozone standard. Figure II-1 presents a series of graphs displaying annual trends over the past several years even in the face of steadily increasing automobile usage. If the EPA is indeed successful in implementing the new ozone eight-hour standard, it would appear that this situation will be exacerbated. Even though the eight-hour averaging time for the new standard is longer, the significantly reduced exceedance level makes attainment problematic for Fairfax County, as indeed it will for the whole metropolitan area. Figure II-2 presents a series of graphs displaying the effects of the new standard.

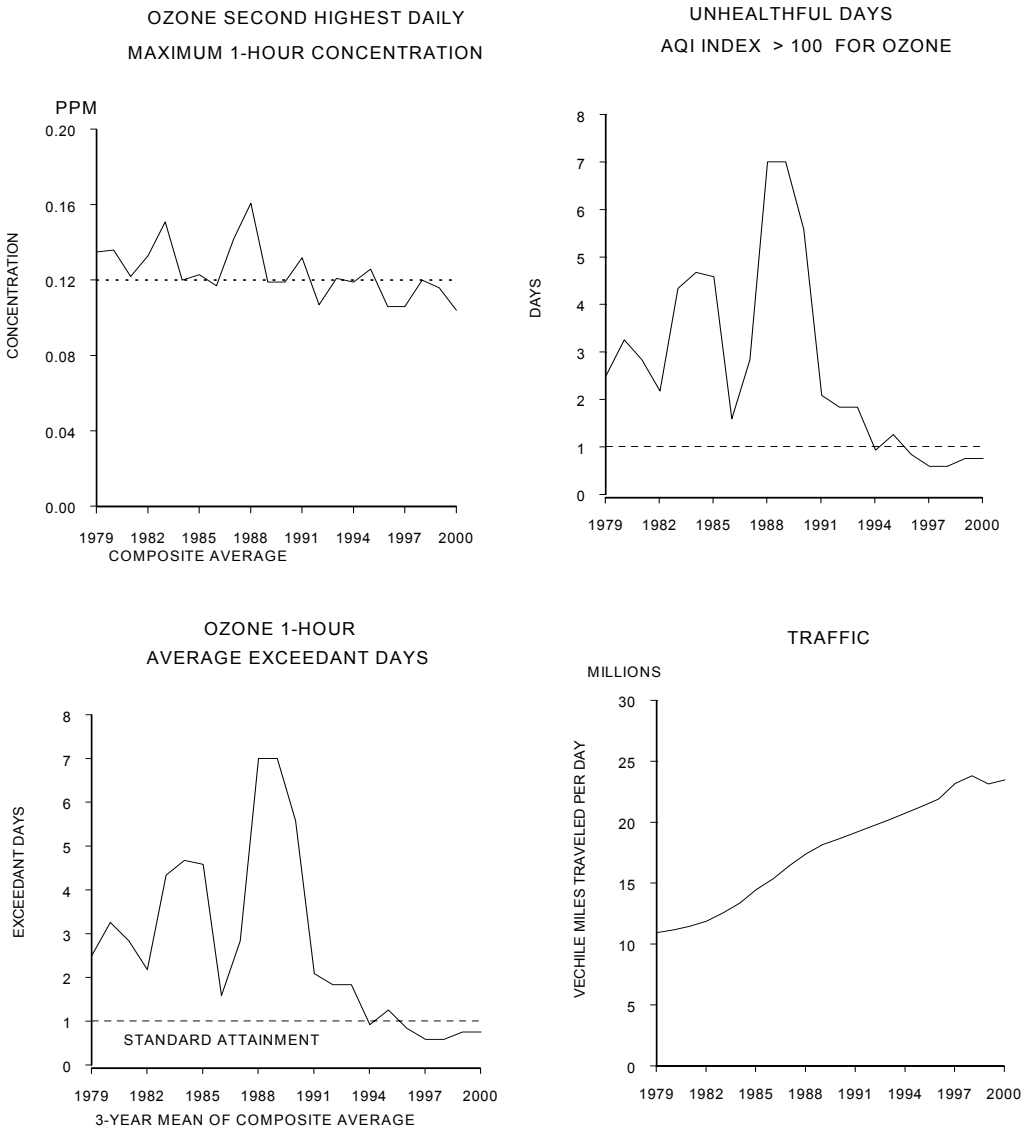
**Table II-1**

**Regional Ozone Exceedances, 2000**

| Date | Location | Maximum One-Hour Ozone (ppm) |
|---|---|---|
| May 13 | Greenbelt, MD | 0.128 |
| June 10 | Greenbelt, MD | 0.142 |
| | Suitland, MD | 0.127 |
| | Mount Vernon, VA* | 0.125 |

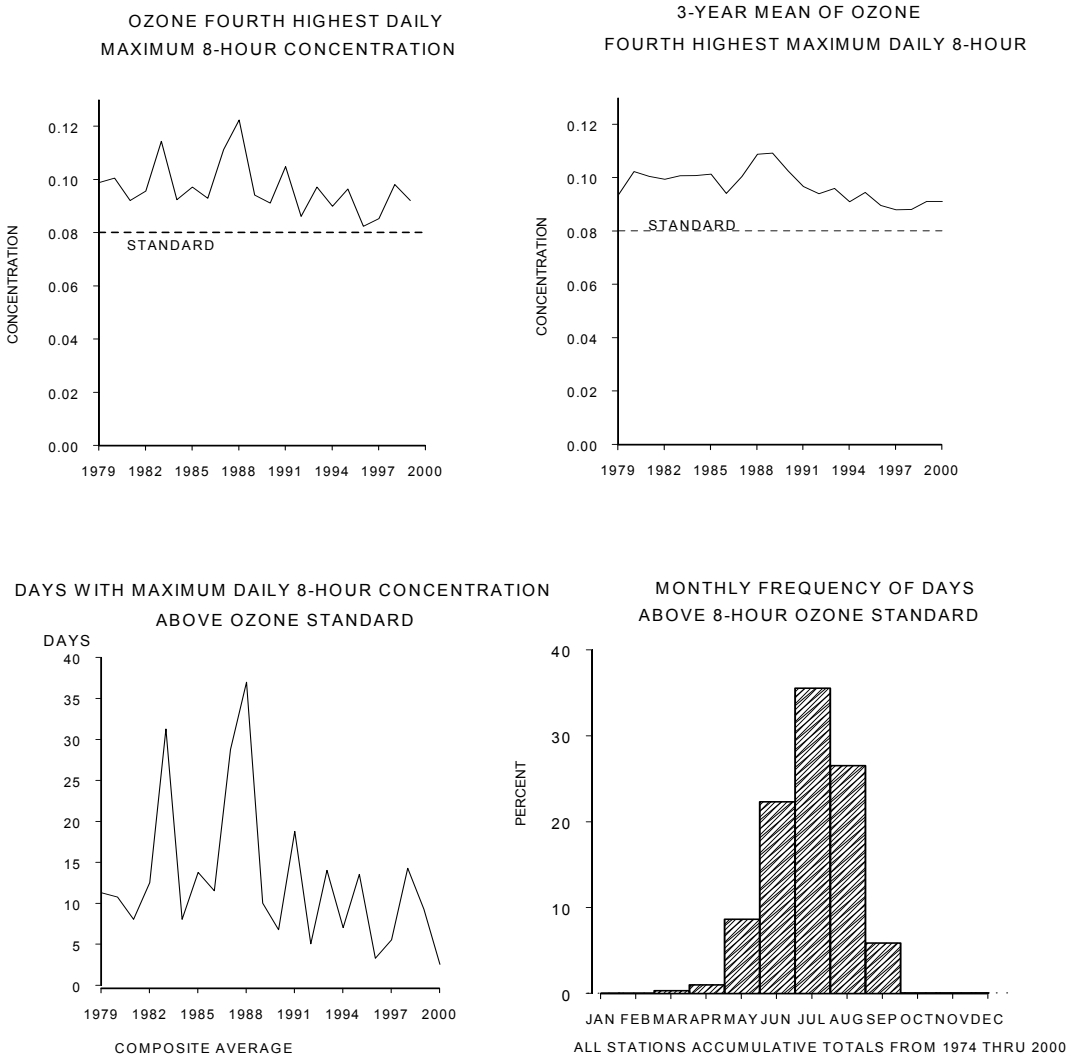
*Fairfax County Monitoring Station
Source: Fairfax County Department of Health

## Figure II-1: Air Quality Trends




Source: Fairfax County Department of Health

**Figure II-2: Air Quality Trends in Relation to an Eight-Hour Ozone Standard**




Source: Fairfax County Department of Health

# B. MAJOR PUBLIC AGENCY RESPONSIBILITIES

## 1. Commonwealth of Virginia

### a. State Air Pollution Control Board

This board is authorized to propose policies and procedures for air quality regulatory programs, including emissions standards for landfills and vehicles.

### b. Virginia Department of Environmental Quality

This department is responsible for establishing standards of air quality monitoring and vehicular inspection and maintenance programs. This department is also the enforcement authority for the federal asbestos regulations.

## 2. Region – Metropolitan Washington Council of Governments, Metropolitan Washington Air Quality Committee (MWAQC)

The Metropolitan Washington Council of Governments ("COG") serves as the regional planning organization of the Washington area's major local governments and their governing officials. COG works toward solutions to problems in such areas as growth, air and water quality, transportation, and housing. This agency is responsible for issuing air quality indices on a weekly basis.

The MWAQC was formed under the authority of the Governors of Maryland and Virginia and the Mayor of the District of Columbia to develop specific recommendations for a regional ozone control strategy for the Washington, DC-MD-VA non-attainment area. This Committee works under COG. About three years ago, Fairfax County increased its representation on MWAQC by appointing a representative of the County Health Department to the MWAQC Technical Advisory Committee.

### a. MWAQC Technical Advisory Committee

This committee reviews technical issues and documents before they are submitted to MWAQC for review and approval.

### b. Forecasting Subcommittee

This subcommittee considers how to monitor and report the new eight-hour ozone standard and how to devise guidelines for issuing health alerts during the ozone season.

### c. Attainment Subcommittee

This subcommittee considers evidence for the case that the Washington non-attainment area can attain the one-hour ozone standard with the control measures already adopted.

**d. Conformity Subcommittee**

This subcommittee reviews projects, which will contribute to transportation demands, including help in determining if a project will contribute emissions which exceed the region's target volatile organic compounds (VOCs) and nitrogen oxides (NOx).

In the past year the Transportation Planning Board (TPB), which is the designated Metropolitan Planning Organization (MPO) for the region, has also been actively involved in addressing the conformity issue. The Air Quality Conformity Determination, which was released in October of 2000, is a key document related to conformity analysis that has been produced by the TPB. It is also the TPB that has convened the task force that is attempting to resolve the NOx shortfall that currently plagues the region as well as Fairfax County.

**e. Air Quality Public Advisory Committee**

This committee has been set up to provide a vehicle to brief citizens on actions pending before MWAQC. This committee functions as an important source of feedback from the public on air quality concerns in the metropolitan area.

## 3. County of Fairfax

**a. Department of Health, Division of Environmental Health, Community Health and Safety Module**

This Division is authorized by the Fairfax County Code, Chapter 103, in cooperation with federal and state agencies, to conduct an air-monitoring program. This division now provides consultative services to those requesting assistance in indoor air quality issues. If there is a substantial threat to public health, on-site investigations may be provided concerning indoor air quality and exposure to toxic substances in non-occupational, indoor environments. This Division also represents the County in its interactions with MWAQC. The representative from the Health Department sits as a member of the MWAQC Technical Advisory Committee and functions as a conduit to communicate with the County on air quality issues of concern to MWAQC.

**b. Department of Transportation**

This agency is responsible for the planning and the coordination of improvements that reduce both congestion and the vehicle miles traveled.

# C. PROGRAMS, PROJECTS, AND ANALYSES

## 1. Regional Air Quality Planning

Having failed to attain the federal NAAQS again in 2000, the County enters an even more tenuous phase in its air quality planning. The elements of this situation are pointed out in some detail in the "Issues and Overview" discussion above.

Although Phase II planning remains underway, the credibility of that effort remains at risk. As we predicted in our report last year, the issue of conformity is becoming more of an issue every day. While it would appear that the County can legitimately project benefits from the NOx SIP Call reductions and the adoption of the Tier II standards for cars and light duty trucks, ongoing failure to attain the one-hour ozone standard in the face of the Earthjustice Legal Defense Fund lawsuit puts the planning capability of the County substantially at risk.

As indicated in our recommendations last year, EQAC is concerned about this situation. We remain concerned, as we were last year, about the need to act now to tighten the links between planning, particularly for transportation needs, and air quality management.

# D. LEGISLATIVE UPDATE

### 1. Summary of Air Quality Laws Enacted by the Virginia General Assembly – 2000/2001

In the 2000 Generally Assembly, the only enacted bill that related to Air Quality was SB 682. In the latter portion of the session, that bill, which was also addressed in last year's *Annual Report on the Environment*, added a school administrator to the indoor air quality task force.

As has been the case in both of the past two sessions, there has not been much activity in the 2001 session addressing the subject of air quality. The only enacted bill so far this year is SB 1386. This is, however, a potentially important piece of legislation that establishes an air emissions banking program. A Joint Resolution (HJ 658) was introduced urging the U.S. Congress to close the loophole in the Clean Air Act that allows the grandfathering of coal-burning power plants, but that Resolution has not yet been acted upon in the Senate. SB 1030 was introduced in the Senate, attempting to redefine the NOx potential to emit threshold for power plants that are within a one-mile proximity of each other. That bill has not yet been passed out of Committee.

# E. CONCLUSIONS AND OBSERVATIONS

1. The responses of the County to last year's Air Quality recommendations warrant particular consideration given the evolving nature of the Air Quality planning dilemma faced by the County in 2001. In what apparently remains a pre-decisional context, the most important element of all may well be the dialogue itself. Therefore, we would like to introduce this year's recommendations by making some observations and clarifications in response to the actions that were recommended by the County last year.

2. We appreciate and heartily endorse the response of the County supporting the need for the integration of permanent air quality planning capability in the County. We have also listened carefully to the County response to the suggestion that a "hard look" be taken at smart growth strategies no matter what happens with respect to the establishment of air quality planning capability in the County. Similarly, we have noted County observations concerning the potentially important role of the Transportation Coordinating Council in helping to coordinate air quality management concerns with transportation planning activities. All of these responses are relevant and timely in setting the stage for a more intense focus on the reality and urgency surrounding this issue. In the final analysis it is this reality and urgency that we urge the County to address.

# F. RECOMMENDATIONS

1. Again this year EQAC recommends that the County take steps to integrate air quality planning needs more directly into the County planning process. As reflected in this year's Annual Report and as we pointed out last year, air quality planning constraints are increasingly becoming a function of executive and regulatory activities beyond the control of the County and even beyond the control of the MWAQC. Concerning MWAQC, while the County has become more active and well represented there the volume, complexity and significance of information is such that it simply cannot be appreciated or presented without further staffing capability. This situation was recognized in the County responses to our recommendations last year, but so far no direct action that we are aware of has been taken to address our concerns. Until additional staffing occurs, the County will continue to struggle with circumstances that are gradually slipping out of the County's control. This remains of such concern to EQAC that we are compelled to raise it again this year as a major point of emphasis.

2. Whether or not additional staffing occurs, it is critical to recognize that there are activities and options available for direct use in the County when it comes to air quality planning, provided those activities and options are discussed and presented clearly and in a timely manner. Our point last year in discussing "smart growth" strategies as an example of a pro-active option in addressing air quality management in Fairfax County was merely that --- an example. We appreciated the response of the County in pointing out that the framework for "smart growth" approaches already exists within the

Comprehensive Planning process. The issue is not however, whether the framework exists. The operative words in our recommendation were to "take a hard look". The essential point here is that these needs cannot be met in a cursory fashion through the establishment of a framework to do the job or through a written exchange such as that represented by the presentation of ARE recommendations and consideration of responses thereto.

What we are really recommending is that in the area of air quality planning the County must develop its own capability to systematically evaluate air quality compliance needs and address them. This will require the direct integration of awareness and understanding of the consequences of continued non-attainment of federally mandated air quality standards. Only by understanding the significance of those consequences before they occur can an appropriate and timely emphasis on options and alternatives really occur. Some of these activities have been undertaken in Fairfax County, but many have not. In our opinion, what the County needs is a more robust and comprehensive discussion on several options any one or several of which might be better suited to the needs of the County than consideration of "smart growth". The key here is to recognize that steps can be taken now and whether or not additional staffing occurs. But these steps will require a commitment of time, energy, and more than anything, an informed focus on issues and real decision-making capability. We agree with the response last year that there are several entities whose activities are relevant to our recommendations here. In concert with efforts to look at additional staffing, we recommend that the County, perhaps through the ECC or through some other existing County entity, heighten its focus on air quality planning needs, whether or not additional staffing occurs.

If ongoing dialogue on these issues would be of benefit, EQAC would be pleased to participate in such discussions. Some air quality management discussions have occurred in the context of the regular EQAC meeting schedule, but these discussions have usually been related to issues of the moment. If appropriate, EQAC would be pleased to participate in further, more focused discussions to clarify its concerns and recommendations.

# LIST OF REFERENCES

Air Quality Annual Report 2000, Fairfax County Health Department, Environmental Monitoring and Trends Analysis section

Air Quality Trends – Washington Metropolitan Area 1985-2000, Metropolitan Washington Council of Governments, Department of Environmental Programs, Washington, DC November, 1999

Air Quality Planning Work Program and Budget – July 1, 2000 through June 30, 2001, Metropolitan Washington Council of Governments, Department of Environmental Programs, Washington, DC February 24, 2000

Questions and Answers on Air Quality Planning and The Phase I Attainment Plan, Prepared on behalf of the Metropolitan Washington Air Quality Committee, for the DC-MD-VA Non-Attainment Area

**CHAPTER III**

# ECOLOGICAL RESOURCES

# III. ECOLOGICAL RESOURCES

This chapter summarizes the status of ecological resources and the actions of public agencies and citizen groups in the management and preservation of these resources.

## A. ISSUES AND OVERVIEW

Open space and natural habitat continue to be reduced in Fairfax County, primarily as a result of housing, commercial development and road building. As this resource is reduced, increased emphasis must be placed on protecting, preserving, and enhancing the remaining open space and natural habitat in Fairfax County.

Fairfax County needs to undertake stronger efforts in order to protect, preserve, and enhance the environmentally sensitive open space in the County. These efforts include the establishment of a Countywide Natural Resource Inventory, followed by a Countywide Natural Resource Management Plan. Additionally, the County needs an aggressive program seeking easements on privately owned environmentally sensitive land. The cooperation between Fairfax County and the Northern Virginia Conservation Trust is starting to address this last issue.

EQAC commends Fairfax ReLeaf, and their volunteers, in their reforestation efforts. EQAC also commends the Fairfax County Park Authority staff in their efforts toward a building a Countywide Baseline Natural Resource Inventory. EQAC supports the Fairfax County Park Authority in their work toward a Countywide Natural Resource Management Plan.

EQAC also commends the Northern Virginia Soil and Water Conservation District for their leadership in a number of activities that will lead to better management of stormwater and protection of stream valleys. Additionally, EQAC commends the Northern Virginia Conservation Trust for pursuing and obtaining easements on privately owned environmentally sensitive land.

## B. PROGRAMS, PROJECTS, AND ANALYSES

### 1. Gypsy Moth Program (and Fall Cankerworm)

The Gypsy Moth Program came under the supervision of the Urban Forestry Branch Chief in December, 1996. This program contains eight positions. In June, 1997, the Gypsy Moth Program office moved from the Government Center building to the Herrity Building.

The gypsy moth was first detected in Fairfax County in 1981. The Board of Supervisors enacted an Integrated Pest Management (IPM) Program to control the gypsy moth, *i.e.*, reduce gypsy moth populations below defoliating levels. The goal of the program is to minimize the environmental and economic impacts of the pest by limiting the amount of tree mortality and use of pesticides in the environment. Each year, the following control methods are considered:

- **Mechanical:** The gypsy moth egg mass Search, Scrape, and Destroy Campaign and Burlap Banding for Gypsy Moth Caterpillars. These are citizen involvement programs.

- **Biological:** Release and monitoring of gypsy moth parasites and pathogens, and aerial and ground applications of *Bacillus Thuringiensis* (*Bt*).

- **Chemical:** Aerial and ground applications of Diflubenzuron on high infestations.

- **Educational:** Self-help program and lectures to civic associations and other groups.

Citizens are encouraged to destroy egg masses and caterpillars found on their properties. Band trees with burlap strips to trap caterpillars. Destroy egg masses by scraping the masses into a container of soapy water.

Gypsy moth caterpillar populations increased significantly in 2001 compared to the previous five years. Whether this a sign that populations will reach outbreak proportions in the near future, or if they will stay at moderate levels, cannot be determined at this time.

Egg mass surveys conducted by the Gypsy Moth Program staff in the fall of 2000 indicated that 1,700 acres in twelve areas of the County had gypsy moth infestations that warranted aerial treatment. Most of the treatment areas were located north of Route 66. In additional to the aerial treatment areas, there were 80 acres in isolated areas that warranted ground treatment. The pesticide used was *Bacillus Thuringiensis*.

The Lake Barcroft Watershed Improvement District reports a significant increase in gypsy moth infestations in Lake Barcroft. Egg mass density increased from 4.8 per acre in 2000 to 42.8 per acre that will hatch in 2001. The density of larvae under burlap bands increased from an average of 1.4 observed last year to 11.0 this year.

While gypsy moth populations have increased, there was no detected defoliation by the gypsy moth in Fairfax County in 2000. However, the Virginia Department of Agriculture and Consumer Services reported 70,000 acres of defoliation elsewhere in the state.

The fall cankerworm, *Alsophila pometaria*, is a defoliating insect found throughout much of North America. This insect is native to the United States and feeds on a

broader range of trees than the gypsy moth. The caterpillar stage of this insect, often referred to as inchworms or loopers, feeds in the spring and will feed on a wide variety of trees, but tends to prefer maples, hickories, ash, and oak -- all of which are found in abundance throughout Fairfax County. The fall cankerworm caterpillars, the only life stage of this insect that causes damage to trees, emerge in early spring about the time of bud break and begin feeding almost immediately. Feeding continues throughout much of the spring until the mature caterpillars drop off the tree, enter the soil, and pupate.

Low level cankerworm infestations can cause nuisance problems due to the number of caterpillars and their droppings. With more severe infestations, defoliation can occur, resulting in stress to the trees and possible tree mortality. As in severe gypsy moth infestations, cankerworm infestations tend to be a severe nuisance to homeowners, making yards and patios unusable for several weeks in the spring. Outbreak phases usually last two or three years in succession and then decrease due to disease, predation, and parasitism. In some instances, however, populations do not decline and some type of control may be warranted. According to experts from the United States Forest Service, this insect thrives in older, mature forest stands that are under stress from external sources. Many older, suburban neighborhoods throughout the County, like those found in Mount Vernon and Lee Districts which are already infested, have this type of forest cover and are suitable locations for sustained outbreaks of the fall cankerworm.

The Forest Pest Program conducted a large aerial treatment program during the spring of 2000 for the fall cankerworm. The staff monitored for adult female moths throughout the Mount Vernon and Lee Districts starting in January, 2001. Results of this monitoring program indicated that the previous year's treatment was very effective. A selected ground spaying program was done in Spring 2001, with about 200 acres treated.

## 2. Riparian Projects

Stream bank erosion is a natural process that begins with water movement from uplands. In areas of urban development, impervious (watertight) surfaces replace vegetative soil coverings, resulting in less water soaking into the ground. As a result, more runoff flowing over land surfaces enters streams, causing excessive stream bank erosion.

Serious undercutting and sloughing of stream banks can occur when stream banks are not adequately protected by riparian vegetation. This stream bank erosion impacts water quality, causing serious problems for fish and wildlife as well as downstream landowners and communities. Thus, water quality and the flora and fauna associated with a healthy stream are closely linked. (See Chapter I, *Water Resources*, for more comments on water quality and stormwater management.)

Many methods exist to stabilize a stream bank. Traditionally, hard structures such as concrete and stone have been the quick fix. These methods may slow down the erosion

process but are costly, unattractive, and environmentally objectionable. Today, many engineers and contractors rely on *bioengineering* techniques, which involve the use of living plant materials to stabilize and rebuild soils and vegetation.

Some bioengineering techniques include:

**Vegetation** -- The stability of a stream bank depends on the establishment of permanent vegetation that can withstand water inundation as well as dry conditions. Live cuttings from willows, dogwoods, and other species that root quickly are incorporated into the soil. Root mass keeps soil in place, and the flexible leaves and branches slow down the flow of water.

**Tree revetments** -- Large whole trees anchored lengthwise along eroding banks with their bottom ends upstream and overlapping one another may provide continuous protection to the bank.

**Biologs** -- Biodegradable logs made of processed coconut husk fiber called "coir" can hold soils and plants in place. A biolog is generally eight to ten feet long and about one foot in diameter. The material is tough, flexible, and absorbent. By the time the "log" biodegrades in seven or eight years, a root network of plants has been established through and behind it.

With such innovative bioengineering techniques and proper planning and design, we can restore stream banks, reduce the amount of pollutants and sediment going into streams, improve animal and fish habitat, and create a more aesthetically pleasing environment.

The Fairfax County Park Authority, in conjunction with other agencies, has been involved with the following bioengineering projects:

- Bridle Path Stream Restoration Project in the Scotts Run Watershed -- The original proposal for this site included approximately 1,000 feet of gabions and other hard engineering stream channel structures. During design, bioengineering was found to be the most appropriate method of achieving stream stability. Design is now complete, with the Northern Virginia Soil and Water Conservation District having provided the final design. A large majority of the residents affected by this project have been expressing their opposition to the implementation of this project due to the proposed removal of several mature trees. FCPA and DPWES are continuing to work on this stream restoration project.

- A proposal to stabilize a portion of another unnamed tributary of Scotts Run is currently being reviewed. This new project is especially interesting in that it was proposed as part of a stormwater management waiver. A reach of tributary stream between a small infill development and the main stem of Scotts Run will be stabilized. This stabilization, of a severely downcut and degraded reach, will ensure that the channel is adequate to pass the existing and future volumes and

velocities of stormwater runoff without further degradation. This stability will reduce downstream pollutant loads through Scotts Run Stream Valley Park and Scotts Run Nature Preserve, and increase the habitat value of an existing natural area. If successful, this would be an excellent model of private-public cooperation that improves water quality and creates quality habitat while allowing infill development.

- Bryans Branch Stream Stabilization Project -- Natural Resource Conservation Service (NRCS), Department of Public Works and Environmental Services (DPWES), and the Park Authority have also been cooperating on what will probably be a more typical application of the fluvial geomorphological analysis/bioengineering process on Bryans Branch in McLean. The lower 2,500 feet of this stream have been severely eroded over the last 25 years. Two 100-foot bends of this stream are on the verge of undercutting the private road to Highland Swim Club and require emergency stabilization. However, funding shortfalls preclude stabilizing the entire stretch. The positive aspect of this project, despite the limits caused by partial funding, is that the entire stretch is being analyzed and the effects (exaggerated erosion on non-treated areas) which result from the emergency treatments will be projected and incorporated into a long term plan. Eventually, the majority of this stream reach will be stabilized using bioengineering techniques rather than rip-rap and gabions, which are required for the emergency underpinning of the road bank. Unfortunately, this stream stabilization project is now tabled indefinitely due to funding limitations. However, construction of the emergency road stabilization portion of the project was completed in the spring of 2000.

The Kingstowne Stream Restoration Project started in 1998 when Fairfax County, the Northern Virginia Soil and Water Conservation District (NVSWCD), the USDA Natural Resources Conservation Service, and two citizens groups (The Friends of Huntley Meadows Park and Citizens Alliance to Save Huntley) formed a partnership to use leading-edge technology to restore and stabilize a severely degraded stream channel to a natural, self-sustaining condition. This project is on land owned by the developers of Kingstowne and involves approximately 800 feet of a stream into which the runoff from Edison High School flows. The stream enters Greendale Golf Course shortly downstream from the project reach and was depositing significant amounts of sediments within a newly constructed stormwater management pond on the course. The material eroded from this channel over the last 25 years was also affecting the health of the Huntley Meadows Park wetlands. NVSWCD received a $103,000 grant from the Virginia Water Quality Improvement Fund, the Fairfax County Board of Supervisors authorized $200,000, and the USDA Natural Resources Conservation Service performed the engineering analysis and design for the project. The citizens' groups provided important local support.

The project used the principles of fluvial geomorphology and soil bioengineering techniques to create gentle meanders that slow the erosive velocity of the flow and natural vegetation to stabilize the stream banks. Erosion has been bought under control

and water quality downstream is improved. The steam passed its first test in December 1999 when it carried a bankfull storm event and performed as expected. Hopefully, this project will be the model for many others in Fairfax County.

A 150-foot segment of Wolftrap Run saw its severely eroded banks restored to a stable configuration in two days. Prior to restoration, the average height of the stream bank was five feet, and the angle was almost vertical to the water surface. After restoration, the bank had a gentle slope protected with biodegradable material, vegetation, and stone. NVSWCD, the Virginia Department of Forestry, and DPWES jointly designed and implemented this demonstration project that clearly shows how the "softer" environmentally sensitive engineering approach is more economical, less labor intensive, and more effective than the traditional methods of stabilizing eroded streams. Traditional engineering calls for pouring concrete into the channel, dumping huge amounts of rock in the stream, or putting gabions (wire grid baskets filled with stone) in the bank. The softer approach used bioengineering techniques.

One project being planned by the Lake Barcroft Watershed Improvement District (WID) is of great interest. For too long, Fairfax County has allowed the headwaters of streams to be piped. Now, the WID is proposing to open up a piped stream. In cooperation with the City of Falls Church, the WID proposes to resurface a short section of Tripps Run adjacent to a Falls Church park and school. The grant project can demonstrate the technique of surface stream restoration including problems, cost analysis, and environmental enhancement monitoring. Hopefully, this project will lead to more of the same in Fairfax County.

## 3. Urban Forestry

### a. Urban Forestry Division

In past Annual Reports on the Environment, EQAC recommended that the staffing of the Urban Forestry Division be restored to the level that existed before budget cuts in 1996. In April 1998, the Board of Supervisors approved the addition of five Urban Forester II positions to the Division, and by the end of 1998, all of these positions were filled. This staff level is still short of levels that existed prior to July 1996. However, with the change in focus of the Urban Forestry Division from front-line staff to consultants to other County agencies, the current level of staffing seems to be working. The current staffing is now:

(1) Division Director
(1) Section Chief, Urban Forestry Section
(8) Urban Forester II
(1) Section Chief, Forest Pest Management Section
(1) Naturalist II
(3) Naturalist I
(1) Secretary

This increased staffing and a re-focusing of duties by the Urban Forestry Division has resulted in a marked increase in work done in two critical areas: zoning cases and plan review and inspection. This increased participation in zoning case review has resulted in tangible improvements in the quality of tree preservation provided during the construction plan design phase, resulting in trees that are healthier, that are better placed to survive construction, and that provide greater overall benefits to the development and the surrounding community.

One of the most intensive projects undertaken by the Urban Forestry Division has been the preparation of draft amendments to the Zoning Ordinance, Public Facilities Manual (PFM), and the Subdivision Ordinance relating to tree preservation, tree planting and tree cover requirements.

Section 12 of the PFM has not received a comprehensive review since its adoption in the 1970s. The existing text includes a significant amount of information that no longer conforms to industry standards. Attempts to bring the standards up to date have resulted in information that is often difficult to follow. The draft amendments are easier to follow, and are in chronological order, from planning and design through the end of construction.

These draft amendments to Section 12 of the PFM seek to address concerns that have been raised by the Board of Supervisors, the development and engineering community, Tree Commission, Tree Preservation Task Force, County staff, and citizens concerning the present methods of calculating tree cover, interior parking lot landscaping, and other tree preservation and planting issues. They include:

- Increased incentives for tree preservation;
- Tree cover credit for seedling planting on two levels--one for reforestation and one for afforestation;
- The inclusion of simplified calculations for interior parking lot landscaping; and
- An overall update to comply with revised industry standards.

The work on Section 12 of the PFM was done by a small group of representatives from the development community, engineers, landscape architects, planners, citizens, and professional arborists. Work was done over a ten (10) month period, concluding in December, 1999. In May, 2001, the Tree Preservation Task Force unanimously endorsed the draft amendments to Section 12 of the PFM. They further recommended that County staff:

- Devise a tracking methodology to gauge the effectiveness of the draft amendments when they become part of the Code;
- Continue to work with the development community on modification of the proposed tree cover system; and

- List in the Public Facilities Manual those trees that are desirable for planting and encourage the use of native tree species over non-native.

The draft amendments will be presented to the Engineering Standards Review Committee. It is anticipated that the Planning Commission and Board of Supervisors will consider the draft amendment package for adoption in early 2002.

The Urban Forestry Division is currently involved in an effort to identify the percentage of the County's landmass that was covered with tree canopy during the years 1990, 1995 and 2000. This information will be derived through remote sensing techniques that use past and present satellite imagery. The quantification of past and present tree cover will be used to identify countywide tree cover percentages, to establish deforestation and afforestation trends, and to set future countywide tree cover goals.

In addition to quantifying tree cover levels, The Urban Forestry Division has received funding through an Urban and Community Forestry Grant to delineate the current geographical distribution of vegetation in the Northern Virginia area (Fairfax, Loudoun, and Arlington Counties and the City of Alexandria) using the United States Federal Geographic Data Committee (FGDC) Standard (FGDC-STD-005, 1997), National Vegetation Classification Standard. The classification will be conducted for 67 major watersheds within the study area.

The primary objective of the vegetation classification project is to provide private and public stakeholders with highly accurate Geographical Information System data that quantifies the historic and current extents and nature of Northern Virginia's forest, wetland, and water resources on an individual watershed basis.

Other objectives include:

1. To provide analytic tools and data that will allow stakeholders to identify and communicate the effects of urbanization trends on existing forest, wetland and water resources within the context of regional and local land-use planning processes;

2. To foster dialogue and collaboration between local stakeholders and encourage multi-jurisdiction efforts to accomplish the goals of the Chesapeake 2000 agreement; and

3. To establish baseline data necessary to formulate individual watershed management plans.

**b. Tree Commission**

The Tree Commission underwent a dramatic revitalization in 2001. Several standing subcommittees were set up to address community outreach and education.

These standing subcommittees will look at ways to interface in a more cohesive process with the public, business, local and county governments, schools, and homeowner associations to provide education regarding tree preservation, tree cover, and planting.

The Tree Commission was instrumental in relocating a specimen American Holly (*Ilex opaca*) to the Government Center. The tree was slated for destruction as part of a development project. Through the hard work of the Commission and County staff, the tree was moved and dedicated.

### c. Open Space Preservation

As a result of EQAC's recommendation that the "County Board of Supervisors emphasize public-private partnerships that use private actions such as purchase of land and easement by existing or new land trusts to protect forests and other natural resources, including champion/historic trees," the Board of Supervisors directed staff to draft recommendations for a public-private partnership with the Northern Virginia Conservation Trust (NVCT). Under this agreement, NVCT would closely coordinate its easement efforts with the Fairfax County and Northern Virginia Regional Park Authorities. Both of these organizations also use easements for park purposes. In those instances where NVCT pursues easements on properties that adjoin parkland or serve park easements, the appropriate park authority would be given first consideration for holding these easements, as long as the property owner had no objections. To date, FCPA owns over 20,000 acres in the County, including sensitive land in the former D.C. Department of Corrections site in the Lorton area (now known as Laurel Hill) and in the western part of the County.

In addition to the formal public-private partnership with NVCT, the County continues to have informal working relationships with other land trusts. The Potomac Conservancy focuses its efforts on the protection of the natural, scenic, recreational, and historical qualities of the Potomac River Gorge. The Virginia Outdoors Foundation focuses on rural land conservation, and the Virginia Department of Historic Resources focuses on historic sites and properties.

## 4. Fairfax ReLeaf

Fairfax ReLeaf came into being in 1991 in response to severe losses of trees in Northern Virginia over the previous two decades. They are an independent, non-profit organization of volunteers who plant trees, improve community appearance, and restore habitat on public and common lands of Northern Virginia. They are involved in the following activities:

- Identification and planning of tree planting projects around Fairfax County and provision of the resources to accomplish those projects.

- Encouragement of urban forestry conservation practices by individuals, private organizations and state and local government.
- Provision of information and support for natural regeneration, mini-woodlands, and mow-free zones as alternatives to planned tree planting.
- Provision of information and assistance for selecting appropriate tree species for specific locations, where to obtain trees, proper tree planting techniques, and caring for newly planted and established trees.
- Promotion of public education on all aspects of urban forestry by providing knowledgeable speakers for meetings of civic groups and other community functions, and providing information to government for the establishment of sound public policy.

Fairfax ReLeaf can be reached through their web site, http://www.geocities.com/RainForest/5663

## 5. Fairfax County Park Authority

The Fairfax County Board of Supervisors created the Fairfax County Park Authority (FCPA) in 1950, authorizing the Park Authority Board to make decisions concerning land acquisition, park development, and operations. As a result, Fairfax County has a system of parks that serve a number of uses, including active recreation such as sports, historic sites and buildings, and environmentally sensitive areas such as forests and stream valley lands.

### a. Acquisition of Park Land by FCPA

In 1998, Fairfax County voters approved a bond referendum giving the Fairfax County Park Authority $75 million over the next six years. These funds are for land acquisition, facility development, and renovation projects. As part of this 1998 Park Bond Program, FCPA is acquiring properties that fall within one or more of the following categories:

- Parcels of 25 acres or more for active recreation;
- Land adjacent to existing parks that will expand recreational opportunities;
- Sites in high density areas of the County deficient in open spaces;
- Lands to protect significant natural and cultural resources; and
- Sites in the rapidly expanding areas of the County.

The Fairfax County Park Authority has done an outstanding job in the area of open space preservation and land acquisition. During FY 2000, the Park Authority acquired 2,056 acres of parkland (the highest land acquisition in any single year in FCPA history), bringing the total owned by the agency to 19,326 acres (as of July 1, 2000). As of October, 2001, the FCPA owned 20,230 acres of parkland. Of the nearly 738 acres of land acquired by FCPA in FY 2001, nearly 486 acres were

partly or fully funded by the Board of Supervisors. In FY 2001, FCPA passed the milestone of 20,000 acres of parkland owned.

**b. Status of ERIC Data and Natural Resource Management Using GIS**

The Fairfax County Park Authority staff continues to develop a Natural Resource Inventory for the County's park system. In the past, a partial attempt at building a Countywide Baseline Natural Resource Inventory was done by the Ecological Resources Inventory Committee (ERIC). Unfortunately, sufficient funding was not furnished to complete this task and the partially complete ERIC database languished. Eventually, with changes in computer hardware and software, this database became unusable. However, the ERIC data has now been successfully converted to the more modern and accessible MicroSoft Access Data Base, but has not yet been edited into a form compatible with the County's GIS program. The Park Authority staff continues to seek the $15,000 needed to finish the conversion of this ERIC data.

Staff was able to present the Lake Accotink dredging program design consultant with Accotink Creek stream condition data and an associated GIS shape file for use in analysis of potential bedload and forebay requirements. A college intern collected this information several years ago, and a volunteer entered the data into a GIS. Having the information available in this form should allow detailed analysis by the consultants at much lower costs than would have been possible in the past.

Park Authority staff is working with the GIS team to develop data entry forms for directly entering natural resource inventory (NRI) information into a GIS accessible database. Over the past year, the agency performed several NRIs as part of master and re-master planning at parks around the County. As these inventory data sets are made available, management needs and alternatives will be easily displayed. When mapped, these NRIs will allow staff and citizens to make intelligent choices about suitable locations for facilities and natural resource areas.

**c. Natural Resource Management Plan**

In past reports, EQAC recommended that the County Board of Supervisors develop and implement a Countywide Natural Resource Management Plan. EQAC noted that in order to do this, two tasks need to be accomplished first: complete a Countywide Baseline Natural Resource Inventory and adopt a unified Natural Resource Conservation Policy. The above efforts by FCPA in recovering the ERIC data base and building a Natural Resource Inventory for the County's park will go a long way toward satisfying this EQAC recommendation. However, the FCPA effort needs to be expanded into a Countywide Natural Resource Inventory in order to identify all areas containing resources and habitat that needs to be protected.

EQAC's past recommendation on developing a Countywide Natural Resource Management Plan is also being partially fulfilled by FCPA. The FCPA staff is

working toward a final draft of its Natural Resource Management Plan (NRMP). This plan identifies the countywide and Park Authority programs and data sources related to natural resources and analyzes Park Authority policies and the Park Comprehensive Plan provisions affecting natural resources. It addresses natural resources management and planning on parklands within the general issues categories of Vegetation, Wildlife, Stormwater Management and Erosion Control, and Human Impact. EQAC continues to recommend that this FCPA effort be expanded Countywide.

**d. Greenways Program**

Implementation of the Greenways Program began in 1997 with the Park Authority staff working with citizens groups participating in the Parks Round Table partnership. FCPA continues to pursue the acquisition of property within the greenways and stream valley trails programs. The targeted stream valleys are those of Accotink, Difficult Run, Pimmit Run, and Turkeycock Run. As is the case with Environmental Quality Corridors (EQCs), the ecological boundaries of Greenways may include both public and private open space. Under voluntary cooperative resource management agreements, the Park Authority could offer technical assistance for enhancing the Greenway benefits of private property. This could include the land owner voluntarily granting conservation easements. Conservation easements have been used successfully by groups such as the Nature Conservancy to protect environmentally sensitive lands, and the Nature Conservancy has found that many landowners support the goal of preserving these environmentally sensitive lands.

During FY 2000, the Park Authority identified a route and a phasing plan for the 31.5-mile Cross County Trail. This will be a multi-modal trail using existing stream valley corridors and some existing trails and pathways from Pohick Road at Pohick Creek Stream Valley north to Great Falls on the Potomac River. Additionally, the Park Authority built or reconstructed 1.9 miles of trails.

EQAC notes that the Greenways Program is valuable in that it can expand the protection of environmentally sensitive stream valleys. However, this program should be aggressively expanded through the use of obtaining conservation easements, where possible, on private properties. As noted above, the Nature Conservancy has been successful in this approach. Additionally, the Northern Virginia Conservation Trust (NVCT) is now over six years old and can acquire conservation easements. The Northern Virginia Conservation Trust has now obtained a number of easements in Northern Virginia, showing that this approach in Fairfax County is feasible. The Board of Supervisors should continue its cooperation with NVCT and aggressively pursue easements aimed at protecting and preserving environmentally sensitive lands.

**e. Wildlife Conflict Resolution and Management**

Wildlife can cause adverse impacts, both in the County's parks as well as in residential neighborhoods. See Chapter IV of this report for a discussion on deer. Beaver activity can also cause adverse impacts. Their activities in stream valley parks can cause excessive losses of mature trees due to flooding. Additionally, beavers will often go into residential neighborhoods for trees. The Park Authority, through its Wildlife Conflict Resolution Policy, is working to mitigate these adverse impacts. Beaver are the most common source of wildlife complaints received by the FCPA. In 2000, the FCPA received more than 25 complaint calls; however, they were able to resolve all these calls without destroying any beaver.

FCPA continues to work to minimize the impact of Canada geese on park properties through humane non-lethal methods. Several golf courses have instituted controlled dog harassment programs, which prevents geese from establishing nests in the parks. Several parks have been addling eggs for three years, and the Federal permit to addle eggs has been extended to include all Park Authority properties. Addling eggs (coating eggs less than 14 days old with corn oil) will stop the egg from maturing, yet the parent goose will not lay another egg since it is still trying to hatch the addled egg. In 2000, over 750 eggs were addled from over 150 nests on Park Authority land. In the areas where addling has been used for several years, the number of nests per year has not substantially changed. However, the geese may be responding to the control efforts as the number of eggs per clutch has increased significantly. FCPA has also been working with Geese Peace Inc., a local non-profit community-based organization, sharing ideas and resources and providing information and logistical support.

### f. Invasive Plant Control Efforts

Invasive plants are a problem because they can outcompete and replace native species. This change in vegetation disrupts the life cycles of many flora and fauna that depend on native vegetation. Huntley Meadows Park again received a grant (a $39,200 matching grant) to be used for suppression and further research on *Microstigeum viminium*, also known as Japanese stilt grass, and *Berberis thunbergii*. This will be the third year in an ongoing active management program at Huntley Meadows that is providing valuable information for use at other sites around the County. The agency is also striving to use native plant species, whenever possible, to stabilize disturbed areas around new trails and other construction sites.

## 6. Agricultural and Forestal Districts

Landowners may apply to place their land in special Agricultural and Forestal (A&F) Districts that are taxed at reduced rates. A&F Districts that are created by the Commonwealth of Virginia must have 200 or more acres. A&F Districts of local significance, governed by the Fairfax County A&F District ordinance, must have at least 20 acres and must be kept in this status for a minimum of eight years.

Fairfax County's policy is to conserve and protect and to encourage the development and improvement of its important agricultural and forest lands for the production of food and other agricultural and forest products. It is also Fairfax County policy to conserve and protect agricultural and forest lands as valued natural and ecological resources, which provide essential open spaces for clean air sheds, watershed protection, wildlife habitat, aesthetic quality, and other environmental purposes. The purpose of the Local Agricultural and Forestal District program is to provide a means by which Fairfax County may protect and enhance agricultural and forest lands of local significance as a viable segment of the Fairfax County economy and as an important economic and environmental resource.

Currently, 45 Local and Statewide A&F Districts exist in Fairfax County, containing a total of about 4,212 acres. This is a decrease of two Local A&F Districts from 1999, and a total acreage decrease of about 150 acres. This is due to the following:

- Dranesville: Gain of one new Local A&F District, the Longacre Farm District and reduction in size by 15.15 acres of the Cajoll District
- Springfield: Loss of two Local A&F Districts due to the expiration of the Giliam District and the withdrawal of the Klare District. (The Klare District was purchased by the School Board as a school site.)
- Mt. Vernon: Lost of one Local A&F District due to the expiration of the Bloomer District.

## 7. Fairfax County Wetlands Board and DEQ Wetlands Activities

Fairfax County staff reviewed approximately 20 Joint Permit Applications to determine if permits were required from the Wetlands Board during 2000. The Wetlands Board evaluated and approved two shoreline erosion control projects during the 2000-2001 fiscal year. In January, 2000, the Fairfax County Board of Supervisors adopted an amendment to Chapter 116 of the Code of Fairfax County, the Wetlands Ordinance, to increase the wetlands permit fee from $50 to $300.

During 2000, DEQ received 17 Joint Permit Applications for proposed activities in Fairfax County. Of these 17, ten did not require permits from DEQ. Those ten dealt with either pier construction, maintenance on water mains, rip-rap construction, construction of utility lines, or wetland impacts that were authorized by U.S. Army Corps of Engineers' Nationwide permits for which DEQ had already provided 401 Certification. DEQ did issue waivers for two of the remaining projects. Both of these projects were waived because the wetland bank credits were purchased prior to the taking of wetland impacts.

The Dulles Airport 2000 project will permanently impact approximately eight acres of the waters of the United States, including wetlands. Approximately 4.23 acres of palustrine emergent wetlands, 2.96 acres of palustrine forested wetlands, and 0.84 acres

of streambed will be impacted. Mitigation for the project is the purchase of mitigation credits (10.99 credits) from the North Fork Wetlands Bank.

The Lorton South property is a commercial development with permanent impacts of 1.28 acres, including 1.06 acres of palustrine forested wetlands, 0.1 acres of palustrine emergent wetland, and 0.11 acres of intermittent stream channel. Mitigation for the project is the purchase of 2.3 acres credits at the North Fork Wetland Bank.

## 8. South Van Dorn Street Phase III Road Project

The U.S. Army Corps of Engineers issued a permit for the construction of South Van Dorn Street Phase III on May 28, 1996. The permit requires that no construction can start on the roadway until four conditions are completed. Three of these conditions are aimed at protecting Huntley Meadows Park.

One condition is that seven parcels of land (102 acres) adjacent to Huntley Meadows Park must be purchased by Fairfax County. This is in lieu of creating wetlands for the five acres of wetlands that will be destroyed in road construction. These 102 acres contain about 69 acres of wetlands and 33 acres of uplands. This action will ensure preservation of the wetlands contained in this 102-acre tract as well as provide a valuable addition to Huntley Meadows Park. Land acquisition has been initiated for these seven parcels. The County has made offers to all the property owners, and County staff is negotiating with these property owners. However, due to difficulties in negotiating with at least one property owner, the Board of Supervisors, on March 5, 2001, authorized using quick-take condemnation under their powers of eminent domain. Once all other conditions are satisfied, the County will acquire the property using quick-take condemnation unless the property owners have agreed to sell.

Another condition is that stormwater management improvements must be accomplished in the Dogue Creek watershed. This includes construction of two new ponds, retrofitting existing ponds, removing silt from existing ponds, and expanding one existing pond. The stormwater management improvements have been funded for design and construction. The Kingstowne developer, in a cooperative effort with the Fairfax County Park Authority, constructed one of these new stormwater management ponds on Greendale Golf Course as a proffer associated with his development. All ponds are now complete with one exception. That pond is designed and construction should be complete by the spring of 2002.

The third condition is that Fairfax County must post a performance bond to monitor and maintain the stormwater management ponds for a period of ten years after construction. Fairfax County must also submit a monitoring plan for the Dogue Creek watershed that is to be approved by the Corps. Fairfax County submitted this plan and it is under review by the Corps. In late summer, 2001, the Corps provided draft comments on the plan to the County and the County will respond before the winter of 2001-2002.

The Corps of Engineers permit for the road construction is valid until December 31, 2004. The County intends to implement these conditions prior to this time. At the present time, it appears that all conditions will be satisfied by the winter of 2001-2002 or the spring of 2002 -- at which time road construction will start.

# C. RECOMMENDATIONS

1. EQAC recommends that the County Board of Supervisors develop and implement a Countywide Natural Resource Management Plan -- an ecological resources management plan that can be implemented through the policy and administrative branches of the County government structure. Two necessary tasks should be accomplished first -- prepare and adopt a unified Natural Resource Conservation Policy, and complete a Countywide Baseline Natural Resource Inventory. The Plan will also require that the Board of Supervisors reinstate funding for the Ecological Resources Inventory Committee. This is a continuing recommendation from past years. EQAC notes that progress is being made in this area due to efforts by the Fairfax County Park Authority staff in their efforts to establish a natural resources baseline inventory. The Park Authority is also preparing a Natural Resources Plan, scheduled for completion in the near future. EQAC fully supports these efforts, urging that they culminate in a Countywide Resource Management Plan. This is a continuing recommendation from past EQAC reports. EQAC's intent is that Fairfax County should have all the tools in place (the policy and the data) to create a plan that will support the active management and conservation of the County's natural resources.

2. EQAC recommends that the County Board of Supervisors emphasize public-private partnerships that use private actions such as purchase of land and easement by existing or new land trusts to protect forests and other natural resources, including champion/historic trees. This is a continuing recommendation from previous years. Both the Fairfax County Park Authority and the Department of Planning and Zoning support this recommendation. EQAC also notes that, with the passage of Open Space Lands Preservation Trust Fund by the State, funds are available to defray landowners' costs of setting up conservation easements. EQAC notes that the Board of Supervisors will be funding the Northern Virginia Conservation Trust (NVCT) in FY 2002 after entering into a public-private partnership between the BOS and NVCT. EQAC notes that if this action is completed, and the resulting program is an aggressive program, EQAC's recommendation should be satisfied.

3. EQAC recommends that the topic of land preservation through easements continue to be publicized on the County's web site and through publications available in magisterial government offices as well as the County Government Center offices.

# LIST OF REFERENCES

*Addendum to Earlier e-mail*, email from cdforbes@deq.state.va.us to Noel.kaplan@co.fairfax.va.us, July 3, 2001.

*Annual Report on the Environment 2000*, Environmental Quality Advisory Council, Fairfax, Virginia.

*Annual Report on the Environment 1999*, Environmental Quality Advisory Council, Fairfax, Virginia.

*Annual Report on the Environment 1998*, Environmental Quality Advisory Council, Fairfax, Virginia.

*"Before" and "After" Stream Restoration: Portion of Wolftrap Run Benefits From Cooperative Effort*, Conservation Currents, Volume 28, Issue 4, Northern Virginia Soil & Water Conservation District, Fairfax County, Virginia, March/April 2001.

*Environmental Quality Advisory Council's Annual Report on the Environment: Information Request for the 2001 Report*, Letter from Lee Stephenson, Division Director, Resource Management, Fairfax County Park Authority, to James P. Zook, Director, Department of Planning and Zoning, May 24, 2001.

*Fairfax County 2000 Agricultural & Forestal District Annual Statistical Report*, Zoning Evaluation Division, Department of Planning and Zoning, Fairfax, Virginia, May 1, 2001.

*Information Requested for the Environmental Quality Advisory Council's 2001 Annual Report on the Environment*, Letter from Michelle Brickner, Director, Office of Site Development Services, Department of Public Works and Environmental Services, Fairfax County, Virginia, to James P. Zook, Director, Department of Planning and Zoning, Fairfax County, Virginia, July 19, 2001.

*Lake Barcroft Watershed Improvement District Gypsy Moth Risk Assessment Report 2000*, National Gypsy Moth Management Group, BioBase Technologies, Inc., Landisburg, Pennsylvania, November 2000.

Letter from Stuart Finley, Director of Operations, Lake Barcroft Watershed Improvement Dirstrict, Falls Church, Virginia, to James P. Zook, Director, Department of Planning and Zoning, Fairfax County, Virginia, May 8, 2001.

*Stormwater Planning Division Input to EQAC 2001 Annual Report on the Environment*, May, 2001.

ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER IV**

# DEER MANAGEMENT IN FAIRFAX COUNTY

# IV. DEER MANAGEMENT IN FAIRFAX COUNTY

## A. OVERVIEW

The adverse impacts of white-tailed deer in Fairfax County are readily recognized as a problem by many of its residents. While the "problem" is seen from a variety of perspectives, there is a general consensus that the root cause is "overabundance" of deer in many local areas. There is also a general public perception that a deer management program is needed to address the "problem".

The road to an acceptable deer management solution, however, is not so easily determined. Some of the factors essential to a solution are subject to strenuous debate and attract a wide spectrum of opinion. For example, what is the optimum population level, and if population reduction is required, what means shall be used? The sport hunting community, recreational nature lovers, residential property owners, environmental preservationists, and animal rights/welfare groups have differing viewpoints on these issues.

## B. BACKGROUND

### 1. Are Deer Overabundant in Fairfax County?

Caughly (1981) defined four contexts in which the term "overabundance" can be understood when referring to an animal species population. These definitions have since been widely used by most serious scholars in the wildlife management field and by public administrators responsible for wildlife management programs.

1. When the animals threaten human life or livelihood.

2. When the animals depress the density of, or destroy, particular favored species.

3. When the animals are too numerous for their own good.

4. When their numbers cause ecosystem dysfunction.

Where does Fairfax County stand vis-a-vis these four criteria? The available data strongly (even overwhelmingly) suggest that:

1. We experience an unacceptable number of deer-vehicle collisions resulting in deaths, injuries, and major property damage. Owners of commercial agricultural and nursery enterprises suffer substantial damage.

2. In many areas of the County, deer routinely leave their enclaves of "natural"

habitat to forage in nearby gardens and yards causing widespread damage to landscaping and thus major economic loss to property owners. Through voracious browsing, deer are rapidly eradicating numerous threatened and endangered botanical species from the "natural" habitat. In addition, this loss of plant habitat is adversely affecting numerous vertebrate and invertebrate species of smaller physical size, such as many bird species, that are unable to compete with large herbivores.

3. Data for Fairfax County, based on Virginia Department of Game and Inland Fisheries (VDGIF) assessments spanning ten years, indicate that its various deer herds showed a single individual in excellent condition, a very few in good condition, most about evenly split between fair and poor condition, and a few emaciated individuals. This shows quite clearly that no longer can the available habitats meet the minimum nutritional requirements that would maintain the deer population in sound health. A 125-pound deer requires approximately 6.5 pounds of forage per day or some 2,370 pounds of vegetation per year.

4. Many of our parklands and stream valleys show severe browse lines, nearly total eradication of understory, and loss of numerous species upon which the continuous process of woodland regeneration is dependent. These changes in turn lead to the inevitable loss of a wide variety of animal species. Thus, our remaining natural ecosystem is being severely deformed through the eruption of a single species that has become overdominant in the food chain.

According to each of Caughly's four criteria, it is apparent that Fairfax County has a serious overabundance of deer. In recognition of the public perception of a significant problem, the Board of Supervisors directed County staff to develop a plan for deer management. In October of 1997, County staff contracted with a consulting firm to "study and review existing data on deer, deer-habitat interactions, deer-human conflicts, and deer management proposals within the County." Staff also asked the consultants to recommend suitable methods for addressing the various problem areas. These studies and recommendations were presented in the Consultants Report (Natural Resource Consultants, December 1997). In 1998, the County created a new position and appointed a Wildlife Biologist who had broad experience with Fairfax County parks and parkland issues. In the summer of 1999, the County Executive convened an ad hoc Deer Management Committee of experts and stakeholders to discuss and evaluate the plan drawn up by the staff and the early implementation efforts. The report of this committee and its recommendations were forwarded to the Board of Supervisors in September 1999 in advance of the season of peak deer problems, which occurs in the fall. The Board of Supervisors approved recommended measures to reduce the deer population to more sustainable and less destructive levels. Since then, the deer management program has made substantial progress in achieving significant population reductions in some of our most threatened parklands.

## 2. A Description of the Problem

### a. Data on Deer Abundance in Fairfax County

To begin this discussion, the terms overabundance and overpopulation should be distinguished. Overabundance refers to population levels that have adverse impacts on the community and other species, while overpopulation refers to population levels of the species that are an imminent danger to itself through disease and starvation. This latter phenomenon is responsible for the population eruption and subsequent collapse of deer herds that has been a topic of scientific study for the past 60 years. While the following information supports a conclusion that deer are overabundant in Fairfax County, neither the data nor experts from a variety of sources have indicated that a level of overpopulation exists, though the relatively poor health of the County's deer suggest that we may be approaching overpopulation.

Data from the Virginia Department of Game and Inland Fisheries deer density surveys in Fairfax County parks prior to the County's deer management program showed deer densities from 90-419 deer/sq. mile (Table IV-1).

**Table IV-1**
**Deer Density Surveys**

| Location | Est. Deer/Square Mile |
|---|---|
| Huntley Meadow Park | 90-114 |
| Riverbend Park | 213 |
| Meadowlark Gardens Park | 90-115 |
| Bull Run Regional Park | 419 |
| Fort Belvoir | 90 |
| Mason Neck NWR | - |

(Source: W. Dan Lovelace, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.)

While the many of the data are limited, taken collectively, the observations of professional park staff, poor health of evaluated deer, and high deer densities indicate that deer are overabundant and are negatively impacting the ecology of sizeable areas of Fairfax County. Unfortunately, there are few reliable data available for densities and extent of damage on private lands and the adjacent small islands and corridors of

natural habitat. Even though the information available is primarily anecdotal, it is voluminous, and there is a general public perception of a significant and growing problem of deer overabundance.

**b. Causes of Overabundance in Urban/Suburban Areas**

i. Urbanization/Changes in Habitat

Over recent decades, Fairfax County has transformed from a largely agrarian and woodland area to a multifaceted employment, residential, and retail area. Nearly 1,000,000 people reside in the 399 square miles of the County. Of these 399 square miles, about 140 square miles are wooded and open land, and some three square miles is remaining agricultural land. This change from an agrarian area to a developed one has markedly decreased the amount of land usually regarded as suitable for deer habitat and has changed their food sources and movement patterns. This urban/suburban habitat of the County provides a fairly good nutritional base for deer, including manicured lawns, athletic fields, college campuses, golf courses, and landscaped residential communities.

Overabundance is particularly common where the course of development has left protected "islands" or "corridors" of deer habitat in or near urban and suburban areas. As the development process reduces the area of natural habitat, deer are forced into these remaining islands and corridors at very high population densities. Because the deer then deplete the forage plants in these enclaves, they venture out into the surrounding developed community in search of food. In such situations, conflicts with humans frequently arise in the form of deer-vehicle collisions and depredations on gardens and ornamental plantings (Flyger et al, 1983; Cypher & Cypher, 1988). Moreover, in such situations, natural predators (e.g., wolves, bobcats, mountain lions) have normally long since been eliminated and hunting is usually prohibited.

ii. Loss of Predators

The precolonial levels of deer in Virginia could be attributed to predation by bobcats, black bears, eastern gray wolves, and eastern mountain lions, in addition to human impacts of Native American hunters. While none of these predators depended solely on deer, the deer/predator interactions and the added effects of hunters kept the levels low. Increasing human populations and land development has virtually eliminated wildlife predators from the County. In the first half of this century, hunting had reduced the deer population to very low levels. However in the latter half of this century, with growing human population and reduction of huntable habitats, recreational hunting has almost disappeared in the County. While the number of deer harvested through “Out of Season Kill Permits” has increased in recent years (Table IV-2), the combination of seasonal hunting and

out-of-season kill permits does not affect the deer population at sufficient levels to prevent significant deer/human conflicts or ecological damage.

**Table IV-2**
**Out of Season Kill Permits Issued For Deer Damage in Fairfax County**
**Virginia Department of Game and Inland Fisheries**

| Year | Permits | Number Taken |
|---|---|---|
| 1989 | 5 | 25 |
| 1990 | 3 | 4 |
| 1991 | 19 | 41 |
| 1992 | 18 | 43 |
| 1993 | 42 | 222 |
| 1994 | 31 | 131 |
| 1995 | 65 | 193 |
| 1996 | 165 | 244 |
| 1997 | 147 | 310 |
| 1998 | 157 | 297 |
| 1999 | 216 | 377 |
| 2000 | 197 | 263 |

(Source: Mark Pritt and Jerry Sims, Wildlife Biologists, Virginia Department of Game and Inland Fisheries.)

**c. Problems Created by Overabundance**

i. Ecological Impact

Effects of a persistent and overabundant deer population include the loss of biodiversity and a negative effect on ecological and biotic systems. These can be seen in a declining understory (lower height plants and shrubs that serve as a food source for birds) and the appearance of browse lines, which occur when deer eat

almost all the vegetation within their reach and the woods develop a "line" at the top of their reach. While few detailed deer/forest impact studies have been performed in the County, in a report to the Division of Animal Control, Fairfax County Police Department, the Superintendent of Administration of the Northern Virginia Regional Park Authority noted that "the ever present browse line had now become a common sight in most of our parks. The deer have eaten all of the herbaceous and woody plant growth within their reach. This has eliminated an entire stratum of habitat from the parks."

The browse line and loss of understory are not the only indications of this ecological impact. There is an abundance of technical literature reporting the effects of a high deer population on plant communities when the lower ecological carrying capacity (see page 10) is exceeded. However, the apparent poor health of the County's deer indicates a level of deer density that reportedly exceeds even the higher biological carrying capacity. There are also numerous studies documenting the negative effects of overabundant deer on wildlife species. For other vertebrates, this may occur through direct competition for food sources or more often by altering the habitat. For example, in some areas of the County the number of species of birds has markedly diminished through loss of the necessary habitat due to excessive browsing by deer.

As noted in the 1997 Consultant Report and throughout the scientific literature, "The consequences of a persistent, overabundant deer problem can be long-term loss of biodiversity and negative impact to functioning ecological and biotic processes." We have already begun to see a loss of biodiversity that will ultimately lead to a loss of ecosystem stability with far more widespread and serious effects than the shorter-term effects of overabundant deer.

ii. Property Loss and Damage (Vehicular, Plantings)

There currently is no accurate system to track data regarding the total property loss due to deer/vehicle collisions. The Fairfax County Police Department does an excellent job of analysis of the data on deer-vehicle collisions that require a police presence in their aftermath or that are otherwise reported. The numbers appear to have increased, but the data do not show a consistent trend (Table IV-3). For those accidents tabulated from January 1998 through May 2001, the average damage per vehicle was about $2,300. Over this same period, the Virginia Department of Transportation picked up 3,450 carcasses of deer killed in vehicular collisions from rights-of-way in the County. However, police and highway experts estimate that only 20-25 percent of deer impacting vehicles die at the scene (i.e., on the road or in the right-of-way); many receive injuries that are soon fatal, but die in the woods or in a nearby yard. Thus, a reasonable estimate would indicate some 13,800-17,250 deer-vehicle collisions in the County during this period. One can reasonably infer that many, if not most, of these collisions result in property

damage to the vehicle.

**Table IV-3**

**Deer-Vehicle Collisions in Fairfax County**

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| Non-Injury | 154 | 149 | 127 | 157 | 168 | 144 | 177 | 144 |
| Injury Crashes | 6 | 10 | 6 | 20 | 17 | 23 | 18 | 17 |
| Fatal Crashes | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| **Total** | **160** | **159** | **133** | **177** | **186** | **167** | **196** | **161** |

(Source: Report prepared by Michael Uram, Fairfax County Police Department.)

County personnel report an increasing number of complaints of damage to native and ornamental plants in Fairfax County. Referring again to the "Out of Season Kill Permits Issued for Deer Damage" (Table IV-2), an indication is given of homeowner attempts to address property loss primarily thought to be ornamental in nature. Further, although numerous deer management programs are available, such as planting less preferred species and fencing, the effectiveness of these methods declines dramatically with increased deer densities leading to declining food sources and willingness of deer to eat even undesirable plants. These activities may also tend to increase vehicular incidents, as deer must look farther afield for food sources.

iii. Disease

Another problem associated with deer overabundance is the prevalence of Lyme Disease. Confirmed cases of Lyme Disease underwent a sharp increase through June, 1997 (Table IV-4). The decrease of the next two years may be attributable to greater public awareness of the threat represented by deer ticks and greater use of proper preventive measures when hiking and working in wooded areas. The recent availability of a vaccine against Lyme Disease may actually account for the significant upturn in reported cases during the last ten months due to further heightening of public awareness and a corresponding increase in the number of persons seeking testing and diagnosis. It is unclear, however, whether a decrease

in deer population will lead to a corresponding decrease in Lyme Disease cases. Other animals can be carriers and may inhabit areas within which deer populations decline.

**Table IV-4**
**Reported Lyme Disease Cases Meeting Centers for Disease Control (CDC) Case Definition Program**

**Fairfax County**

| Period Covered | Reported Cases | Contracted outside of Fairfax County |
|---|---|---|
| July 1994-June 1995 | 14 | N.A. |
| July 1995-June 1996 | 22 | N.A. |
| July 1996-June 1997 | 31 | N.A. |
| July 1997-June 1998 | 16 | 8 |
| July 1998-June1999 | 13 | 9 |
| July 1999-June 2000 | 50 | 8 |
| July 2000-June 2001 | 51 | 9 |

(Source: Fairfax County Department of Health)

While it is true that vaccination of those intensively exposed to deer ticks is likely to result in a decline in human incidence, for the vast majority of the population, consistent use of ordinary preventive measures should be entirely adequate. In our Annual Report last year we noted the availability of the Lymrix, vaccine manufactured by Smith-Kline-Beecham. There is now more information available about the experience with this vaccine. Consult with your personal physician about the advisability of being vaccinated. Other sources of up-to-date information on this vaccine are the U. S. Public Health Service Centers for Disease Control and Prevention in Atlanta and the Food and Drug Administration in Rockville.

The Fairfax County Department of Health has available an excellent booklet entitled Preventing Tick-borne Diseases in Virginia. They also have a brochure titled Rabies and Animal Bites: What you should know and what you should do. Additional information is available through the Health Department section of the County web site www.co.fairfax.va.us.

# C. ISSUES IN ADDRESSING THE PROBLEM

To effectively manage the deer population, the implications and interrelationships of population dynamics, carrying capacity, public opinion, and methods for management must be understood and incorporated into the program.

## 1. Understanding Population Dynamics

The concept of population dynamics is crucial to understanding the current problem and the development of a workable solution. There are no simple mathematical models that can be applied to determining the growth of the population of a species in a particular area, and the least complex deer management models and programs based on solely on nutritional deer carrying capacity (see section on carrying capacity below) consider neither the deer population's interactions with the human population nor its interactions with a biodiverse ecosystem.

One important concept to understand is that of home range. Deer show a strong attachment to a home range, and it has been shown that deer forcibly relocated often die of malnutrition even if food is accessible in their new habitats. When natural dispersal from the home range occurs, it is usually the younger males that migrate. This has four implications for Fairfax County deer management:

1. Deer often occupy a home range that can include both a park and the surrounding community or islands and corridors of "natural" habitat plus the yards and gardens of adjacent residential communities;

2. A dramatic decrease in one area will not necessarily result, in the short term, in an increased dispersal of deer from other areas into the depleted area, with a consequent lessening of population density in those other areas;

3. Deer cannot be eliminated from the County under today's conditions, because the deer surviving in surrounding home ranges will, in the long term, undergo natural dispersal and repopulate the depleted areas. This implies that parks and the surrounding areas must be managed as a unit and that solving the problem in one area does not automatically translate to another area; and
4. The recent emergence of epizootic hemorrhagic disease (EHD), a viral disease fatal to deer but posing no threat to humans, may be a significant factor in natural reduction of the deer population over the next several years. EHD has sometimes been implicated as a significant factor in the boom-bust cycle observed within deer populations that have been the subject of long-term study. Within the past year, 53 deer fatalities due to EHD have been diagnosed in the southeastern portion of the County, and these diagnosed cases probably represent only a small fraction of

those succumbing to the disease. Weather, the size and compactness of deer herds, and the overall health of the deer play a major role in EHD transmission. Thus, it is not possible to predict the future course of this disease within the County, except to note that it usually takes several years to run its course within a deer population and we appear to be in the early stages of an outbreak.

Other concepts that affect population dynamics include compensatory reproductive responses, survival, and predation. Again, it must be noted that deer management is not a simple mathematical equation; it must take into account many biological and behavioral factors, many of which are not fully understood, especially in an environment such as Fairfax County. For example, in many cases, as the size of an animal population decreases, the number of offspring increases despite the fact that food is becoming less adequate. This phenomenon leads to the population eruption-crash cycles that are widely discussed in the scientific literature. More complete data and an improved understanding of the unique characteristics of Fairfax County must be collected and considered as the management program evolves.

## 2. Determining Carrying Capacity Goals

Carrying capacity is the level of a population that can be supported by an ecosystem or tolerated by the community. To determine the appropriate population level as a goal for a management plan, it is essential to distinguish among the following:

1. Biological carrying capacity, i.e., a species specific level that is primarily concerned with the population that can be supported with the available nutritional resources;

2. Cultural carrying capacity, i.e., a level that is driven by human concerns (the population that can be tolerated by the community at large); and

3. Ecosystem carrying capacity, i.e., the population level that can be supported by an ecosystem without disturbance of its stability or reduction of its biodiversity.

The biological carrying capacity is a traditional view that has been widely used by fish and game departments where a primary concern is to maintain adequate stocks of deer for sport hunting, but it does not adequately account for the effects of relatively high population levels on the ecosystem in which the species resides. The cultural carrying capacity is defined by Ellingwood and Spingnesti (1986) as the maximum number of deer that can coexist compatibly with local human communities before conflicting with some human interest. This level is driven by human values, economics, and desires independent of ecological considerations. DeCalesta (1998) used the term diversity carrying capacity in a more restrictive sense than ecosystem carrying capacity, but both concepts consider the maximum species population density that does not negatively impact diversity of fauna or flora, including diversity of habitat structure as well as species richness. He contends that

deer impacts on biodiversity occur at population densities well below traditional definitions of ecosystem carrying capacity.

Thus, biological carrying capacity is the highest population density and is considerably in excess of cultural carrying capacity (human societal tolerance), which in turn accepts notably higher densities than ecosystem carrying capacity. Finally, diversity carrying capacity has the smallest maximum population density.

### 3. Considering Public Opinion

Goals for management and methods to use to reach those goals are very different issues; consensus or conflict among groups of constituencies may occur at either or both levels. Goals may vary from a biological carrying capacity level that meets hunting concerns to a much lower carrying capacity level based on an ecological or biodiversity perspective. Cultural carrying capacity may run the gamut of levels, depending on the varying values and tolerances of different constituencies within the community. Even where there is agreement on the level of deer density desired, the methods to reach those goals may be in dispute. Some groups may have a zero-tolerance for lethal means, whereas others may readily support managed hunts or sharpshooters.

As indicated in the 1997 Consultant Report, deer control action by the County should not be undertaken until it is determined that there is sufficient community and political support for it. Again, the need for data, this time in the form of public opinion surveys, is stressed. Additionally, the need to adequately educate the public about the issues is needed to ensure well-informed constituent responses.

## D. METHODS FOR DEER POPULATION MANAGEMENT

### 1. Population Reduction Approaches

#### a. Let Nature Take its Course - Eruption/Collapse

This approach is based on using no human intervention to affect the deer population one way or the other. This has been studied by wildlife biologists for more than half a century. The findings are that the population goes through an eruptive phase with explosive population growth until it is far above biological carrying capacity. This is followed by eruptions of parasitic and infectious diseases (such as EHD) and by large-scale starvation, which causes the population to crash to perhaps 15-25 percent of its peak level. Thereupon, the herd recovers to begin the cycle anew. Some populations have been followed through five or six successive cycles. Although the deer population of Fairfax County can be considered to be in the early stages of the eruptive phase, it is well short of a peak. Public concerns about the current and expected future impacts on the community rule this out as an option.

**b. Lethal Methods**

i. Managed Hunting

Experiences with managed hunts over the past year indicate they have been highly cost effective in that revenue has exceeded costs for personnel and materials. This is in sharp contrast to their initial use in 1998, when costs were high and relatively few deer were taken. The dramatic upturn in the learning curve is very encouraging. Necessarily, managed hunts are conducted primarily in parkland, and while the amount of deer population reduction in these local areas is no doubt ecologically beneficial, in terms of absolute numbers it has been insufficient to make an immediate noticeable difference in the overall problem.

ii. Archery Hunting

Archery hunting has proven an effective and acceptable means of deer control in residential areas where use of firearms is deemed too hazardous. Archery is a quiet and short-range method, with most deer being taken within less than 100 feet. During the 1998 public hunting season, 789 deer were taken in Fairfax County, of which 597 were taken by archery and the remainder by shotgun. In 1999, archery accounted for 686 of the total of 1,046 deer, and in 2000 accounted for 626 of 1,028 deer. With out-of-season kill permits, archery can be used year-round, even in residential neighborhoods.

iii. Traditional Public Hunting

Under current restrictions outlined by VDGIF, the above figures show that traditional public hunting is not sufficient to address the problem, based on hunters' limited access to deer habitat and preference for antlered deer. Moreover, the habitat that is accessible is not where the major problem areas are located.

iv. Trap and Kill

This method has usually been conducted by darting with anesthetics and dispatching the animal by gunshot or a lethal drug. The former is less effective than sharpshooters while the latter leaves the meat unfit for human consumption. The use of drop nets and stun guns are explained in the 1997 Consultant Report as a possible lethal method. This method allows for release of non-targeted males and results in meat uncontaminated by drugs but is very cost inefficient.

v. Sharpshooters

The use of professional animal control personnel, police experts, or qualified and experienced volunteers has been proved to be a safe, cost-effective, and successful means of management if lethal methods are employed. Earlier experience with this method in Fairfax County has led to significant refinements and greatly improved cost-effectiveness, with a cost per deer taken ranging from $4.15 to $22.97. Once again, the number of deer removed from the population by this method is not sufficient to have more than a small local effect.

vi. Reintroduce Predators

The reintroduction of the usual species of deer predators into an urbanized setting such as Fairfax County is biologically unworkable and publicly unacceptable.

**c. Nonlethal Methods**

i. Trap and Relocate

Experiments with this approach have been largely unsuccessful due to high initial mortality (up to 85%) of the relocated deer. Moreover, there are few locations within a reasonable distance of this area that would accept relocated deer, since most nearby areas have similar problems. The use of drop nets and stun guns are suggested in the 1997 Consultant Report as a possible method for deer capture. More traditional methods use anesthetic darts. This method is considered infeasible for Fairfax County.

ii. Contraception

Steroidal/hormonal contraception has proved very costly and difficult to implement and only very marginally effective. Immunocontraception, on the other hand, holds some promise for deer management, but it is currently in an experimental stage. The Humane Society of the United States is conducting field studies at the enclosed National Institute of Standards and Technology site in Montgomery County, but due to difficulty with marking deer, the Humane Society is not yet conducting studies for free-ranging deer such as those in Fairfax County. The recent technical literature discusses requirements for sites chosen for pilot tests. All indications are that this is not a near term solution for the County but might hold promise for limiting populations in the future, once they have been reduced to desired levels.

## 2. Conflict Mitigation Approaches

Conflict mitigation is directed toward reducing the direct impacts of deer on the human population and thereby increasing the tolerance of the community for the existing deer

population.

**a. Supplemental Feeding**

Conceptually this approach is supposed to divert deer from the landscape plantings in gardens and yards. Supplemental feeding might somewhat improve the health of the existing deer population but would almost certainly drive it to even higher levels. Thus, consideration of this approach would be counterproductive for Fairfax County since it does nothing to reduce the excess deer population.

**b. Fencing**

Fencing is only rarely effective since deer are noted for leaping even eight-foot fences. Thus, fencing is a costly and ineffective solution, especially when deer are seeking out preferred plant species.

**c. Repellants**

Repellants have had some limited success but are generally costly and most require frequent replenishment. Also many of them have odors that are no more acceptable to humans than they are to deer.

**d. Roadside Reflectors**

Roadside reflectors divert light from vehicle headlights toward the sides of the roadway and are intended to frighten the deer away from the road, thereby reducing the likelihood of vehicle collisions. The method is useful in the evening and early morning hours when the majority of deer-vehicle collisions occur. While expensive, this technique has shown some promise in tests. The Virginia Department of Motor Vehicles has given the County a $40,000 grant to conduct studies of the effectiveness of roadside reflectors. The first test site was a section of Telegraph Road that has had a high incidence of deer-vehicle collisions. The initial results show promise but are confounded by three other factors: (1) construction activity in the area may have driven many deer away, (2) a high incidence of epizootic hemorrhagic disease that may have naturally reduced the population, and (3) an archery hunting program at Fort Belvoir that definitely reduced the population in that area. The County staff has identified and begun testing at additional test sites, but these also have problems that render data interpretation extremely difficult.

**e. Underpasses**

Construction of underpasses has been suggested as a way of providing deer with a safe means of getting to the other side of busy roads. Not only is it exceedingly costly, but there are no data available now or expected in the future that would pinpoint likely

sites. This approach is regarded as wholly impractical.

**f. Use of Less-Favored Plants**

Landscaping with plant species that are less favored by deer has been advocated as a way of reducing depredation of yards and gardens. However, as Cypher & Cypher (1988) and numerous other wildlife biologists have shown, when deer populations exhaust the preferred plant species they readily turn to those less preferred. Thus, in the short term this approach might seem to work but longer-term experience indicates that it is relatively ineffective.

# E. PUBLIC EDUCATION PROGRAM NEEDS

As noted above, an educated public that has an understanding of the population dynamics of deer, the concepts of carrying capacity, the different management options, and an understanding of the various values of the community in addressing ongoing management is essential to the successful implementation of a deer management program. The recommended public education program should:

- Use the County's established Deer Management web site **(www.co.fairfax.va.us/comm/deer/deermgmt.htm)** as a primary vehicle for making much of the information mentioned below more readily available and updatable.

- Develop pamphlets that are easily read and easily mailed, and make these pamphlets available through various County offices and through the local Supervisors' offices. These should include information on:

  - Deer and deer biology.
  - Ecosystem and population dynamics in general, and as they relate to the interaction between deer and their interactions with other species of both plants and animals.
  - Methods of population management, including their relative feasibility and cost-effectiveness for achieving both short-term and long-term goals.
  - The deer management program.
  - Permits required for implementation of private control measures.
  - Fencing and repellents.
  - Safe driving and how to avoid deer on the road.
  - Lyme disease and its prevention.
  - Who to contact for additional information.

- Establish networking among the following agencies for provision of consistent public information:

- Fairfax County Government offices.
- Fairfax County Supervisors district offices.
- Fairfax County Animal Control Division.
- Nature Centers.
- Health Departments.
- State agencies, particularly Virginia Department of Game and Inland Fisheries and the Virginia Department of Transportation.
- The Humane Society.

- Compile and make available a comprehensive bibliography of literature on deer management in urban environments. (The references attached to this section provide a limited example.) Make this information available to schools, civic and technical groups, and interested individuals.

- Establish an archive of evidence documenting how deer can change the characteristics of a landscape. This should show:

  - Habitat characteristics before deer damage.
  - Habitat characteristics during and after deer damage.
  - Habitat characteristics during regeneration after deer population is reduced.
  - Statistics and trends for vehicle/deer collisions, number of injuries/fatalities, and types of damage.

- Create a visual display of the above for use at schools, fairs, libraries, etc., and develop presentations for use at public meetings and meetings of civic groups.

- Establish a County self-service telephone number for wildlife problems and public information. This could be a menu driven hotline that would direct people to the proper location on the information network or to the appropriate County office.

# F. PUBLIC AGENCY RESPONSIBILITY

The Division of Animal Control of the Fairfax County Police Department has been assigned primary responsibility for deer management by the Board of Supervisors. However, due to the legal concept that ownership and disposition of wildlife is vested in the state, the Virginia Department of Game and Inland Fisheries exercises significant regulatory and permitting functions that affect Fairfax County's deer management activities. The Division of Animal Control, in coordination with applicable land-holding agencies (e.g., Northern Virginia Regional Park Authority, Fairfax County Park Authority) and other public authorities, implements the Integrated Deer Management Plan on public lands. In addition, the Division of Animal Control advises private businesses and residents in addressing deer management on privately owned parcels in Fairfax County. Deer management on federally owned tracts of land within Fairfax County (e.g., Mason Neck National Wildlife Refuge, Fort Belvoir, etc.) is

the responsibility of the respective federal agencies and is subject to the applicable federal policies and regulations.

# G. PROGRAM IMPLEMENTATION ACTIVITIES

An Integrated Deer Management Plan was developed by County staff subsequent to the Consultant Report received in December, 1997. In November, 1998, the Board of Supervisors directed that program implementation activities commence. Subsequently, in the summer of 1999, the County Executive convened a Deer Management Committee comprised of experts and various stakeholders to evaluate the plan and initial implementation efforts and to prepare recommendations for the Board of Supervisors for further implementation of the plan during the fall and winter of 1999-2000. This committee meets annually to review progress in program implementation and to make recommendations on additional approaches. The Division of Animal Control of the Police Department prepares the annual Fairfax County Deer Management Report to the Board of Supervisors that contains extensive data on the program. Additional material may be found on the County web site (www.co.fairfax.va.us/community/deer)

On December 8, 1997, the Fairfax County Board of Supervisors approved managed hunts for Riverbend Park and the Upper Potomac Regional Park, both in the Dranesville District. Plans by the Animal Control Division were approved by the Northern Virginia Regional Park Authority and the Fairfax County Park Authority for four managed hunts for each of the two locations. The hunts were planned for January and February of 1998. The managed hunts conducted in 1998 were largely unsuccessful in achieving planned program objectives and had associated costs that were difficult to justify. However, some of these costs could be attributed to greater-than-necessary safety measures that experience now indicates would not be needed in the future. In contrast, four managed hunts, involving 132 hunters, conducted in the fall and winter of 1999-2000 were very cost effective, with 195 deer taken at a cost per animal of $9.51. The seven managed hunts conducted in the fall and winter of 2000-2001 involved 223 hunters, who took a total of 351 deer at a cost per animal of $17.94. Of the 351 deer taken, 222 were donated to a program that feeds needy families.

The sharpshooter program, which utilizes Police Department Special Operations tactical teams, has been cost-efficient from the outset. These teams must engage in extensive marksmanship training on a regular basis in order to maintain the required proficiency. Instead of practicing on a target range, they are utilizing this required training time in a field setting with the deer more closely resembling operational targets. The harvested deer are collected by a charitable organization that provides meals to the needy. Even in the early part of the learning curve, this program has shown satisfactory harvest rates. Whereas similar programs in most mid-Atlantic jurisdictions have harvests listed in hours per deer taken, Fairfax County in 2000 had a harvest rate of 1.54 deer per hour. From late December 1999 through late January 2000, fourteen sharpshooting sessions over a total of 41 hours were conducted with a total harvest of 89 deer at a cost of $4.15 per animal. In the same period of 2000-2001, there were

23 sharpshooter sessions, totaling 94.75 man-hours, which took 146 deer at a cost per deer taken of $22.97. A major reason for this increase in cost per animal is that most of the sites this year represented repeat visits to locations first addressed last year. As the herd population density decreases, the time expended on each animal increases, and this is further increased by the increased wariness of the surviving members of the herd. Thus, the costs are very much in line with expectations and will drop once again as more new sites are brought into future years' mix of new and old locations.

Clearly, the managed hunt and sharpshooter programs must be conducted largely in parkland due to safety considerations, but this is also where some of the most substantial benefits are to be achieved. From the outset, the Northern Virginia Regional Park Authority has taken a position of active involvement and has reaped corresponding benefits. The Fairfax County Park Authority has been slow to become actively involved and avail itself of the clear benefits offered by the program to the ecology of its parks. It is to be hoped that in the upcoming deer management season the Fairfax County Park Authority Board and executive staff will much more directly involve the FCPA in the program and thereby exercise the ecological stewardship that is so necessary to the biotic health of our parks and parkland.

Out-of-season kill permits have, for some years, been one of the few legal avenues open to private property owners to permanently remove deer that are causing serious damage to their properties. Such permits are issued by the Virginia Department of Game and Inland Fisheries after verification of the damage. Generally, however, permits are only issued for holders of larger property parcels because of safety considerations. Fairfax County should work in coordination with the VDGIF to make these permits available on a wider basis to qualified residents.

The use of roadside reflectors (strieter-lite technology) that reflect automobile headlights into wooded areas bordering the roadside has been suggested as a method of discouraging deer from crossing roadways in the evening and early morning hours when most deer-vehicle collisions occur. In mid-November 1999, the Board of Supervisors approved $10,000 for a pilot program to test strieter-lite reflectors in selected locations. In addition, a grant of $40,000 was received from the Virginia Department of Motor Vehicles for testing and evaluation of this technology at several locations in Fairfax County. Unfortunately, all of the test locations experienced confounding factors such as roadway modification, adjacent development, deer herd reduction through hunting and disease, etc., that made it impossible to draw reliable inferences from the collected data. In addition, the manufacturer of the reflectors has apparently discovered that the initial design was reflecting light in a part of the spectrum to which deer's eyes are relatively insensitive, and the design is now being changed. Such inferences as can be drawn from the data suggest that there is only a slight reduction in deer-vehicle collisions due to the use of reflectors. This conclusion appears to be borne out by tests in other eastern areas where there was an absence of confounding factors.

Even though Fairfax County does not presently have a pilot project to test the feasibility of immunocontraception, this technology is showing significant potential for the future. A program being conducted by the Humane Society of the United States on the campus of the

National Institute of Standards and Technology in Montgomery County is being carefully monitored for possible applicability to Fairfax County. After the deer population has been reduced to generally acceptable levels, this methodology might provide a feasible method of sustaining these levels in local herds for the long term. In mid-November, the Board of Supervisors approved $10,000 to develop a pilot demonstration program on deer contraception.

# H. CONCLUSIONS

The need for a comprehensive deer management program for Fairfax County does not appear to be in serious dispute. However, there is perhaps a somewhat wider array of opinion about the appropriate context for determining carrying capacity level for the management program and the particular methodologies to employ in reaching program goals.

As noted in much of the reference literature, deer have traditionally been viewed as livestock and woodlands and meadows as pasture. Deer management models and programs have been based largely upon nutritional deer carrying capacity that does not consider issues of biodiversity, altered natural processes, natural herd demographics and behavior, or adverse impacts on mankind. The discrepancy of views can be seen in comparing a report by the Virginia Department of Game and Inland Fisheries with the recent Consultant Report. The VDGIF report states that deer densities ranging from 90-419 deer per square mile have been reported in various County parks and that ideal deer densities are 15-20 deer/sq. mile of suitable habitat. However, the 1997 Consultant Report and much of the scientific literature argues that a deer density of no more than 8-15 deer/sq. mile is required to meet a biodiverse goal of deer management. Many of the assumptions upon which the Integrated Deer Management Plan for Fairfax County is based need to be validated by further environmental assessment of the County and reconciled with more precisely defined ecological goals.
It is evident that, while deer in Fairfax County have not reached a state of overpopulation (as earlier defined), they are near biological carrying capacity as shown by their poor physical condition and their relentless foraging outside their "natural" habitat. It is equally evident that, for the majority of citizens, deer have greatly exceeded cultural carrying capacity in terms of representing a serious vehicular hazard and their depredations on both private landscaping and our public parklands. There is now substantial evidence documenting the fact that ecological and biodiversity carrying capacities have long since been exceeded.

In light of the Environmental Quality Advisory Council's role as an advocate for protection of environmental quality, it is EQAC's view that a biodiversity approach is needed in Fairfax County. However, as cautioned in the 1997 Consultant Report, EQAC too cautions against attempts to move forward with a response without adequate data, a clearly articulated plan, and education and consensus building of all major stakeholders. While moving quickly may assuage the concerns of some vocal groups, a true solution must address the problem with a long-term approach, considering all major stakeholders. Management must address an ecological goal that is based on sound science and considers the value system of an educated community.

All of these caveats having been noted, the problem has now reached such proportions that every feasible approach must be employed not only to keep the burgeoning deer population in check, but more important, to systematically reduce it to sustainable levels. It is evident that the current managed hunt and sharpshooter programs have reached an admirable level of cost-effectiveness but are not reducing the countywide deer population at a rate sufficient to achieve the recommended biodiversity carrying capacity. Thus, it is incumbent upon the Board of Supervisors to continue to take increased and decisive action to address this problem over the long term, while recognizing that it is not going to be possible to please all of the people all of the time. It is likewise incumbent upon the Fairfax County Park Authority to much more actively participate in the deer management program in order to exercise the necessary stewardship of the ecological well being of the County's parkland.

# I. RECOMMENDATIONS

1. EQAC recommends that the Board of Supervisors continue to implement and monitor the comprehensive deer management program set forth in the Integrated Deer Management Plan adopted in November, 1998 and refined by the Deer Management Committee in the summer of 1999. EQAC strongly supports the following broad goals encompassed in the plan and in the subsequent studies and evaluations:

   - Management based on reduction of local deer populations to sustainable levels.

   - Management based on a sound ecological approach that emphasizes biodiversity without preferential treatment of particular species.

   - Management based on an "in perpetuity" perspective that does not trade long-term interests for short-term gains.

   - Protection, restoration, and enhancement of the natural areas and environments that have been subjected to degradation by deer overabundance.

2. EQAC strongly endorses on-going public input into the Deer Management Plan, including surveys of public opinion and the inclusion of major stakeholders (home owners, environmental preservationists, public safety experts, wildlife biologists, public health experts, sport hunting groups, animal rights groups, etc.) in the refinement and implementation of the plan. EQAC fully supports continuation of both the input of a broad range of views and the use of spokespersons who can articulate program goals and the ongoing management approach to the varied community groups and viewpoints.

3. EQAC strongly recommends increased participation of the Fairfax County Park Authority in the deer management program in order to provide improved stewardship of the parks,

golf courses, and other parklands under its care and management. To this end, EQAC requests the Board of Supervisors to share with the Park Authority EQAC's concern about the current level of participation of the FCPA.

4. EQAC believes that, in addition to the measures implemented on public lands, the management program must address the problems of small private (mostly residential) property owners who are suffering serious impacts from deer and develop means for them to legally exercise effective control measures.

5. EQAC believes that the management program must accomplish, at a minimum, the following key objectives:

   - Immediate and sustained reduction of the deer population in order to return the size of the local herds to levels consistent with the long term carrying capacity of their particular local habitats.

   - Ongoing monitoring of availability of methods for maintaining population limits over the long term, such as the promising, but still experimental, immunocontraception method.

- Consideration of development in the County and its effects on ecosystem health and biodiversity as these relate to deer management as well as to the quality of life generally.

6. Since public acceptance of management programs is more easily achieved when there is full public understanding of the problem, the available management options, and their costs and other consequences, EQAC urgently recommends that the Board of Supervisors continue to provide for a vigorous and enhanced program of public education.

# ACKNOWLEDGMENTS

EQAC gratefully acknowledges the following individuals and organizations who have generously provided a variety of data and information included in this report and numerous helpful suggestions and recommendations:

Earl Hodnett, Wildlife Biologist, Division of Animal Control, Fairfax County Police Department.

W. Dan Lovelace, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.

Mark Pritt, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.

Jerry Sims, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.

Michael Uram, Analyst, Operations Support Bureau, Fairfax County Police Department.

Allan Rutberg, Ph.D., Senior Scientist, Humane Society of the United States.

Pat McElroy, Wildlife Biologist, Humane Society of the United States.

Greg Weiler, Manager, Mason Neck Wildlife Refuge, U.S. Fish and Wildlife Service, U.S. Department of the Interior.

Harriet Calloway, R.N., Epidemiologist, Fairfax County Health Department.

Todd Bolton, Natural Resources Manager, Fairfax County Park Authority.

# LIST OF REFERENCES

NOTE: Most of the references listed below contain extensive bibliographies. The two symposia of 1997 contain between them 83 papers, each with its own separate bibliography, which, in the aggregate, offer hundreds of additional references for those wishing more detailed information on a variety of specific topics.

Caughly, G. 1981. Overpopulation. In: Jewell, P. A. & Holt, S. (Eds.). Problems in management of locally abundant wild mammals. pp. 7-20. Academic Press, New York.

Cypher, B. L. & Cypher, E. A. 1988. Ecology and management of white-tailed deer in northeastern coastal habitats. Biological Report 88 (15) U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC 20240.

DeCalesta, D. S. 1998. Effective diversity carrying capacity: An expanded concept for deer management. U.S. Forest Service Report, U. S. Department of Agriculture (Northeastern Forest Experiment Station, P.O. Box 928, Warren, PA).

Division of Animal Control, Fairfax County Police Department. Fairfax County Deer Management Report to the Board of Supervisors, September, 2001.

Ellingwood, M. R. & Spignesi, E. 1986. Management of an urban deer herd and the concept of cultural carrying capacity. Transactions of the Northeast Deer Technical Committee 22: 42-45.

Fairfax County Department of Health. Preventing Tick-borne Diseases in Virginia.

Fairfax County Department of Health. Rabies and Animal Bites: What you should know and what you should do.

Flyger, V., Leedy, L. & Franklin, T. M. 1983. Wildlife damage control in eastern cities and suburbs. Proceedings of the Eastern Wildlife Damage Control Conference, 1: 27-32.

McShea, W. J., Underwood, H. B. & Rappole, J. H. (Eds.) 1997. The science of overabundance: Deer ecology and population management. Smithsonian Institution Press, Washington and London. [400+ pages, 23 peer-reviewed papers presented at a symposium organized by the Smithsonian Institution Conservation and Research Center, available in the book section of the National Museum of Natural History gift shop.]

Natural Resource Consultants, Inc. Fort Hill, PA. December, 1997. Deer Management Recommendations for Fairfax County, Virginia.

Warren, R. J. (Ed.) 1997. Deer Overabundance. Wildlife Society Bulletin 25 (2) (Special Edition) pp. 213-577. [60 peer-reviewed papers presented at a special symposium organized by the Wildlife Society. Available from the Wildlife Society, Washington, D.C.]

ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER V**

# WASTE MANAGEMENT

# V. WASTE MANAGEMENT

## A. ISSUES AND OVERVIEW

Unlike past years of this report, the issue of the amount of trash entering the I-95 Energy/Resource Recovery Facility (E/RRF) does not dominate the landscape. Rather, funding for public benefit programs is of concern. In the past, programs such as the household hazardous waste collection program, recycling education and administration, and other programs to benefit County residents were paid from profits earned on trash "tipping" fees. Fees to tip a load of trash at the County E/RRF or I-66 transfer station were $45/ton across the board. In an effort to increase the tonnage of waste entering the E/RRF so that the County would not fall below its contractually required minimum tonnage, tipping fees were lowered for haulers who would agree to deliver a specified amount of trash.

At the time that this action was taken, EQAC expressed concern that funds for other programs would be depleted rapidly, forcing the programs to be cut back or disbanded. Such is the case now. County staff is working to find ways to fund public benefit programs. For the time being, County General Fund money will supplement revenues from the disposal fees collected from hauling companies. However, a long-term solution is difficult to design. County staff considered an across-the-board fee; however, problems associated with collection of the fee, fair distribution of the equity among properties, and the timeframe for implementation caused it to be dropped from consideration.

In addition, the County is about to embark on an analysis and decision making process that will determine the future of waste management in the County for the next several decades. In 10 years, the E/RRF will revert to County ownership. Key decisions are needed regarding the future of the facility—including whether to continue a contractual relationship with an operator, take over operations, or discontinue operations altogether. A visionary strategy for waste management in the County can result.

## B. PROGRAMS, PROJECTS, AND ANALYSES

### 1. Waste Disposal

#### a. Solid Waste

i. I-95 Landfill Ground and Surface Water Monitoring[1]

The I-95 landfill is located on Federal property under the control of the District of Columbia. It is near the D.C. Department of Corrections facility and juvenile detention center; however, both of these facilities receive water from the Fairfax

County Water Authority. In addition, Mills Branch underlies the landfill and drains to the Occoquan River.

Surface water at Mills Branch also is monitored for a number of parameters by the County. A spring drain collection system in combination with basin aerators has improved the stream water quality, according to DPWES. Waters collected from this point are sent to the Noman M. Cole, Jr. Pollution Control Plant (formerly the Lower Potomac Pollution Control Plant).

In September, 1995, the County embarked on an Assessment Monitoring Program for groundwater monitoring at the closed I-95 solid waste landfill. Groundwater at the landfill moves in a shallow, unconfined flow toward Mills Branch and is conveyed under the landfill in a subsurface culvert. At the southern boundary, groundwater flows to the Occoquan River.

The County received a permit amendment from the I-95 Landfill from the Virginia Department of Environmental Quality (VDEQ) in August 2000 to incorporate Groundwater Protection Standards and other facility modifications. Where a Federal Maximum Contaminant Limit (MCL) existed, the County proposed the MCL as the standard. Where an MCL did not exist, the County proposed alternate standards based on State-recommended levels. A second amendment was received in November 2000, to make technical corrections that were needed in several tables that contained incorrect information.

Groundwater sampling from 21 monitoring/piezometer wells took place in March and September, 2000. Samples for the assessment program are taken from a total of 16 of the 21 monitoring/piezometer wells—six located upgradient of the landfill and ten located downgradient of the landfill. Data from the sampling events are analyzed to determine if a statistically significant increase in contaminant concentrations exists. Several of the downgradient wells sampled in March 2000 exhibited a statistically significant increase for one or more parameters analyzed. During 2000, a number of volatile organic constituents and inorganic constituents were detected above the MCLs. The volatile organics included benzene, 1,2-dichloroethane, cis-1,2-dichloroethene, trichlorofluoromethane, tetrachloroethene, 1,2-dichloropropane, methylene chloride, vinyl chloride, and trichloroethene. The inorganics included chromium, lead, and nickel.[2]

The modification to the landfill's permit also allowed the facility to use tire chips for a protective barrier above Phase 2 of the Area Three Lined Landfill liner. Construction of Phase 2-A of the Area Three Unit began in the spring of 2000 and was completed in January 2001. This area, which is approximately 14 acres, will

supply the County with an additional four years of ash disposal capacity. The remainder of Phase 2, approximately 11 acres, will be constructed in 2004.

Using tire chips for the project was a success for the Solid Waste Disposal and Resource Recovery Division in several ways. First, the County used over 10,000 tons of tires (over a million passenger tires) in the protection layer. This productive use negated the use of sand normally used in the protection layer, saving the expense of the sand. Second, the VDEQ contributed nearly $22 per ton from the Tire End User Reimbursement Fund for the use of the tires, making the additional grinding economically feasible. When considered together, the savings for the project amounted to over $500,000. The liner will be covered with 18 inches of sand for leachate drainage and primary protection; however another layer of chipped tires will be used above the sand layer to facilitate further protection.

The landfill amendment also allowed for the construction of two asphalt pads at the landfill. The pads used screened combustor residue as the base material. The pads were constructed during the fall of 2000 and are now in use. Both have asphalt surfaces, and they serve as the impervious liner material required for closure. The combustor ash was placed before paving and serves to strengthen the pad as a rigid base. Combustor residue was only used from the E/RRF because it is screened for metal recovery. Initial tests conducted by the County indicated that the material hardened after approximately one week to 100% density, similar to concrete treated stone. A monetary savings of nearly $100,000 was also realized on this project due to the avoided cost of the stone. This project was highlighted in an article in the *Fairfax Journal*. Staff will be evaluating the performance and stability of these pads. The evaluation process may lead to alternative uses for the ash product from the E/RRF.

ii. I-95 Methane Gas Collection and Landfill Gas Emissions[3]

There are over 250 landfill gas extraction wells located at the I-95 Landfill, making it the largest landfill gas collection system of any facility in the State. Michigan Cogeneration Systems operates two facilities that generate 3,000 kW of electricity from landfill gas. These two plants have continued to operate at 98 percent availability since their start-up and operate 24-hours per day. Landfill gas also is sent to five enclosed flares onsite at the landfill.

In 1997, the County completed installation of a pipeline between the I-95 Landfill and the Noman M. Cole, Jr. Pollution Control Plant (NCPCP) that provides landfill gas as a fuel source for the NCPCP biomass incinerators afterburners, which control odors and eliminate volatile organic compounds.

Recently, regulations were finalized limiting emissions of non-methane organic compounds (NMOC) from municipal landfills. NMOC includes volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and odorous compounds. The County engaged Malcolm Pirnie to estimate NMOC emissions from the I-95 landfill. The results of the analysis using EPA Tier 2 sampling methodology indicate that NMOC emissions are less than 50 megagrams per year. As a result, the I-95 landfill is not expected to be considered a major source of air pollution. This finding reflects the effectiveness of both the existing landfill gas collection system and the final soil cover, which ranges in depth from 10 to 30 feet and prevents vertical migration of NMOC emissions.

iii. I-66 Landfill and Transfer Station Facility[4]

Groundwater monitoring continues at the I-66 Landfill. The wells that were upgraded in 1992 continue to function properly. While there is not regulatory requirement to monitor the groundwater at this site, the Division of Solid Waste Disposal and Resource Recovery samples the groundwater biannually. The Transfer Station was inspected by the State DEQ several times in 2000 and was found to be in compliance, with no deficiencies noted.

The I-66 Transfer Station provides waste collection and recycling facilities in the western end of the County. The Citizen's Recycling and Disposal Area continues to be popular with residents, and maintenance continues at the site.

**b. Waste Water**

i. Upper Occoquan Sewage Authority[5]

The Upper Occoquan Sewage Authority (UOSA) is located in Centreville, Virginia; it serves the western portions of Fairfax and Prince William Counties as well as the Cities of Manassas and Manassas Park. The Water Reclamation Plant includes primary-secondary treatment followed by these advanced waste treatment processes: chemical clarification, two-stage recarbonation with intermediate settling, multimedia filtration, granular activated carbon adsorption, post carbon filtration, breakpoint chlorination, and dechlorination. The plant's design treatment capacity is at the mid-expansion level of 32 million gallons per day (mgd). When expansion is complete, UOSA will have a capacity of 54 mgd. Completion of the expansion will occur sometime in 2003.

The plant operates under a Virginia Pollutant Discharge Elimination System

(VPDES) Permit, which is issued by the VDEQ. The permit limits and the 2000 plant performance are shown in Table V-1.

**Table V-1. UOSA Permit Requirements and 2000 Performance**

| Parameter | Limit | Performance |
|---|---|---|
| Flow | 32 mgd | 24 mgd |
| Chemical oxygen demand | 10.0 mg/L | 8.9 mg/L |
| Turbidity | 0.5 NTU | 0.4 NTU |
| Total Suspended Solids | 1.0 mg/L | 0.4 mg/L |
| Total Phosphorus | 0.1 mg/L | 0.004 mg/L |
| Surfactants, mg/L | 0.1 mg/L | 0.002 mg/L |
| Total Kjeldahl Nitrogen | 1.0 mg/L | 0.5 mg/L |
| Disinfection Minimum Chlorine Residual | 0.6 mg/L | 0.6 mg/L |
| Dechlorination Chlorine Residual | Non detect | Non detect |

Source: Upper Occoquan Sewage Authority

In 2000 both the plant maximum 30-day average flow and the average daily flows were below the design flow of 32 million gallons per day. The highest rolling 30-day flow was observed in April 2000 (28 million gallons per day). The maximum flow day during the months of February, March, April, September, and December 2000 exceeded the plant capacity. The excess flows were diverted to the Emergency Retention Ponds and subsequently treated during days of lower flows. UOSA continues to perform well within all of its permit limits.

UOSA produces and treats two types of residuals: biosolids from conventional treatment and lime solids from chemical treatment. Anaerobic digestion decomposes the organic residuals to relatively stable compounds. The digested residuals are conditioned with lime and ferric chloride and dewatered by recessed chamber filter presses (RCFPs). Thickened lime residuals are gravity thickened and dewatered on the RCFPs. The biosolids are then loaded into trailers and hauled off site under contract to be land applied or landfilled. All lime solids are landfilled on site in a permitted industrial (nonhazardous) landfill.

ii. Noman M. Cole, Jr. Pollution Control Plant

The NCPCP, located in Lorton, is a 54 million gallon per day (mgd) advanced wastewater treatment facility that incorporates preliminary, primary, secondary, and tertiary treatment processes to remove pollutants from wastewater generated

by residences and businesses in Fairfax County. The original plant, which was placed in operation in 1970 at a treatment capacity of 18 mgd, has undergone two capacity and process upgrades to meet more stringent water quality standards than in the past. The NCPCP receives approximately one-half of Fairfax County's domestic and commercial wastewater flow. After the plant treats the wastewater, it is discharged into Pohick Creek, a tributary of Gunston Cove and the Potomac River.

The NCPCP operates under a VPDES permit issued by the VDEQ. The plant is required to meet effluent discharge quality limits established by the DEQ to protect Pohick Creek and the Potomac River. Table V-2 presents the current NCPCP effluent monthly limitation and the facility's performance in 2000.

Construction to expand the NCPCP to 67 mgd began in 1997, with completion planned by 2002. This expansion includes process upgrades to remove ammonia to less than 1 mg/l and total nitrogen to less than 8 mg/l in order to meet Virginia Water Quality Standards for ammonia and Chesapeake Bay goals for total nitrogen. In addition, upgraded odor control systems, instrumentation and control systems, and a new septage receiving facility are included in this project.

**Table V-2. NCPCP Permit Requirements and 2000 Performance[6]**

| Parameter | Limit | Performance (12/31/00) |
|---|---|---|
| Flow | 54 mgd | 42.48 mgd |
| $CBOD_5$ | 5 mg/l | <2 mg/l |
| Suspended Solids | 6 mg/l | 2.2 mg/l |
| Total Phosphorus | 0.18 mg/l | 0.13 mg/l |
| Chlorine Residual | Non Detect | None Detected |
| Dissolved Oxygen | 6.0 mg/l (minimum) | 8.7 mg/l |
| pH | 6.0-9.0 (range) | 7.2-7.5 |
| Fecal Coliform | 200/100ml | <1.03/100ml |
| Total Nitrogen | None (currently) | 16 mg/l |
| Ammonia | 306 or 552 dg/day (seasonal) | 16.6 kg/day |

Source: U.S. EPA, Permit Compliance System

iii. Blue Plains Sewage Treatment Plant

The Blue Plains Sewage Treatment Plant manages 300 mgd of wastewater for the region, including parts of Fairfax County. This flow makes Blue Plains the Nation's largest wastewater treatment facility. Blue Plains operates pursuant to a National Pollutant Elimination Discharge System (NPDES) permit issued by the

U.S. EPA. Table V-3 presents current Blue Plains effluent monthly limitation and the facility's performance in 2000.

The Blue Plains Regional Committee began the process of updating the Metropolitan Washington Council of Government's (COG's) Regional Wastewater Flow Forecast Model (RWFFM) in 2000. COG and its contractors, Metcalf & Eddy, Inc., are updating baseline year flows, conducting analysis of hydrogeological base conditions, and evaluating other baseline parameters. Recommended changes will be provided to the Committee, and revised input parameters will be used to development new wastewater projections for the region.

### c. I-95 Energy/Resource Recovery Facility (E/RRF)[6]

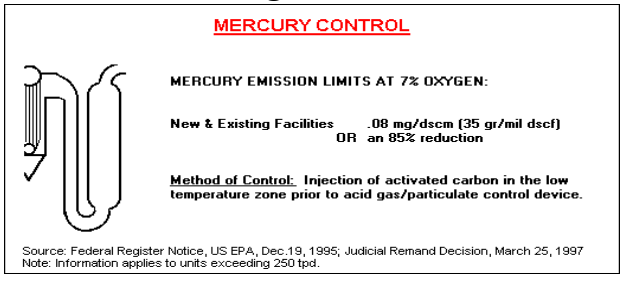
The I-95 E/RRF is operated by Odgen Martin Systems of Fairfax. In May 2000, the County and Ogden Martin signed a modification to the Service Agreement to reflect changes necessary for compliance with the Clean Air Act requirements. The new federal requirements are highlighted in the boxes to the right (Figures V-1 through V-5).

**Table V-3. Blue Plains Permit Requirements and 2000 Performance[7]**

| Parameter | Limit | Performance (12/31/00) |
|---|---|---|
| Flow | 300 mgd | 288 mgd |
| $CBOD_5$ | 5.0 mg/l | 2.97 mg/l |
| Suspended Solids | 7.0 mg/l | 4.3 mg/l |
| Total Phosphorus | 0.18 mg/l | 0.10 mg/l |
| Dissolved Oxygen | 5.0 mg/l (minimum) | 8.1 mg/l |
| pH | 6.0 – 8.5 (range) | 6.8 |
| Fecal Coliform | 200/100 ml | 164/100 ml |
| Total Nitrogen | None (currently) | 16 mg/l |
| Ammonia | 1.0 mg/L | 0.61 mg/L |

Source: U.S. EPA, Permit Compliance System

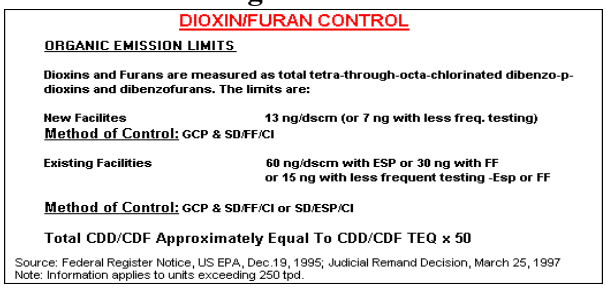
**Figure V-1**




The agreement provides for the installation of several new air emission control devices to the facility. Specifically, a carbon injection system has been installed to

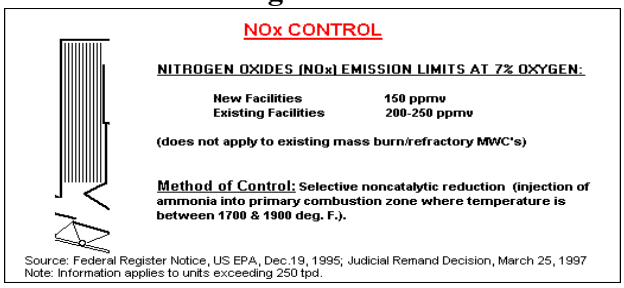
reduce mercury emissions and has been operating since November 1999.

**Figure V-2**



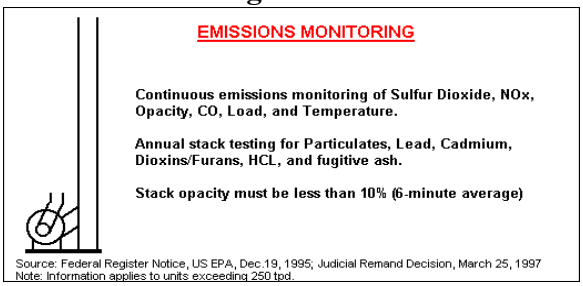

The carbon injection system will also work to reduce dioxins. (Dioxins can be formed in municipal waste combustions due to the presence of chlorine and incomplete combustion of wastes.) Although dioxin levels currently are low at the E/RRF, new permit limits will be about 62 percent lower. The carbon injection system will reduce dioxins to the lowest extent possible for current technology.

**Figure V-3**



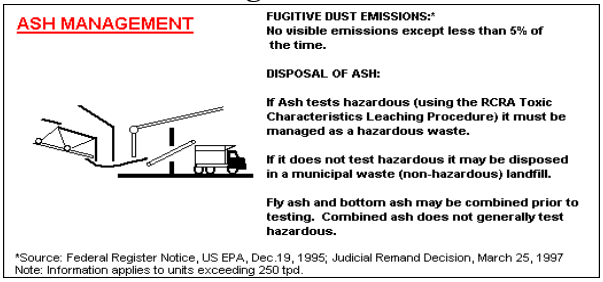

An aqueous ammonia injection system also was installed in will reduce the emission of nitrogen oxides. This system, commonly referred to as a selective catalytic reduction technique, will lower emissions by over 30 percent. Modifications also were made to the acid gas scrubber system to further reduce the sulfur dioxide emissions.

**Figure V-4**




Completely new continuous emissions monitoring devices were installed. These devices replaced older equipment and will monitor opacity, sulfur dioxide ($SO_2$), temperature, oxygen ($O_2$), carbon monoxide (CO), and oxides of nitrogen ($NO_x$). The E/RRF performs air emission testing on an annual basis, as part of its permit requirements with the VDEQ. This information is sent to the VDEQ, and the facility has always met its permit requirements, an achievement of which it can be proud.

**Figure V-5**




The facility also installed an ash

conditioning system to reduce dust from the ash product and to enhance the metal recovery from the ash.

Together, the capital improvement cost for these Clean Air Act improvements totaled nearly $7.75 million. The operating costs of these devices will also add approximately $1 per ton to the processing costs of the facility.

In 1994, the County switched from testing ash generated by the incineration process from a carbon dioxide ($CO_2$) Saturated Water Test to the Toxicity Characteristic Leaching Procedure (TCLP) in response to a Supreme Court decision stating that ash was not exempt from hazardous waste requirements. The TCLP tests require sampling over a two-week period, and analyses cost $80,000. The County last conducted ash testing in 1994, stating that the waste stream has not changed sufficiently to require additional testing. This is in compliance with existing regulations, which only require additional testing if the waste stream changes in a way that would affect the ash residuals. Ogden Martin does, however, conduct regular testing using a shorter list of constituents and abbreviated sampling period.

A few years ago, fees for tipping wastes at the E/RRF were reduced to $34/ton in an effort to increase the regular flow of trash to the unit. In 2000, County staff worked with large waste companies serving Fairfax to secure commitments to tip wastes at the lower fee. A commitment is required for all companies tipping more than 5,000 tons of waste per year. By the end of 2000, all large companies had signed these agreements. County staff attributes this participation to rising fuel costs associated with transportation of wastes to down-state disposal facilities. In FY 2002, the tipping fees will increase to $37.95/ton.

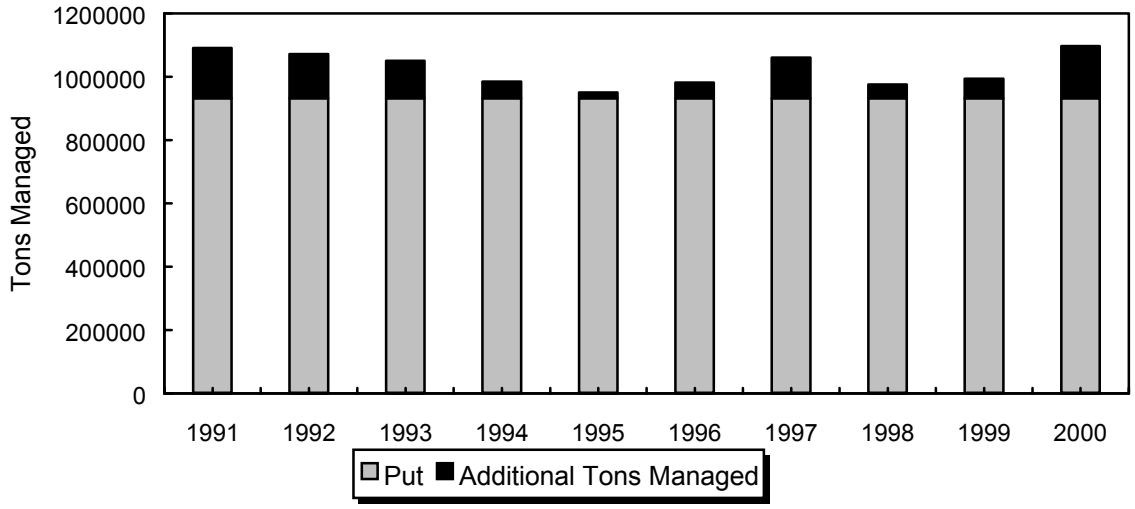
Fairfax County has a contractual agreement with Ogden Martin to provide 931,000 tons of solid waste per year to the Energy/Resource Recovery Facility (E/RRF, commonly referred to as the I-95 trash incinerator). Should the County fall below this minimum, referred to as the "put," penalties can be assessed. The penalty can equal the tipping fee plus the revenues lost due to lower production of electricity that is subsequently sold. Figure V-6 presents the total amount of trash managed each year between 1991 and 2000. The bottom of each bar shows the "put" quantity and the dark region at the top of each bar shows the quantity of waste managed above the "put" appears in black. As shown in Figure V-6, the quantity of waste managed above the put decreased to a low in 1995 and increased in 1996 and 1997 before decreasing again in 1998.

County staff is commended for its diligent work. To date, the County has remained above the minimum "put."

## 2. Waste Reduction/Recycling Programs[8]

In calendar year 2000, the County recycled 405,540 tons of materials. This computes to a 35.6 percent recycling rate. The following sections describe the recycling programs in the County.

**Figure V-6. Historic Trends in Waste Quantities Managed at the E/RRF, 1991 - 2000**




Source: Fairfax County Department of Public Works and Environmental Services

### a. Residential Programs

#### i. Multimaterial Residential

Multimaterial residential recycling became mandatory in September, 1992 for all single family homes, residential townhouses, apartment complexes, condominium units, and residential duplexes with curbside collection. Multimaterial residential recycling became mandatory in 1993 for residential units with dumpster service.

Curbside collection of newspapers, glass containers, and metal food and beverage cans is required weekly. Additional voluntary collection of plastics, mixed paper, and cardboard may be offered by private haulers. For multifamily dwellings such as apartment buildings that maintain central collection areas in the complex, pick up of recyclables is not required on a weekly basis as long as the premises are maintained in a clean and sanitary condition. Multi-family complexes of more than 100 units are required to recycle newspapers.

Recycling amendments to the *Fairfax County Public Facilities Manual* became effective for new Site Plans submitted after September 1, 1993. A Recycling System Statement on the Site Plan cover sheet identifies properties required to recycle, so that appropriate facilities may be planned prior to building occupancy. These requirements do not apply to single family residential complexes that will have curbside collection of refuse and recyclables.

Most of the County's residential units receive trash and recyclable collection from approximately 30 private haulers. The Department of Public Works and Environmental Services provides refuse collection and a contractor provides recyclable collection for approximately 39,000 households. In December 2000, the County expanded the materials collected for curbside recycling to include mixed paper and cardboard. For those not serviced by the County or private haulers, refuse and recycling collection is available once a week at Solid Waste Reduction and Recycling Centers (SWRRCs, formerly called "Park Outs").

ii. Yard Debris

In 2000, the County managed 64,607 tons of yard debris and 37,873 tons of brush. Approximately 43,632 tons went to Loudoun Composing. To educate the public, the County has literature on managing yard debris at home and a video entitled *Essentials of Composting*, which is available from libraries and the County Recycling Office. The County also has information on backyard composting, recycling and mulching of grass clippings, and landscape alteration.

iii. Drop-Off Centers

Fairfax County operates eight Recycling Drop-off Centers (RDOCs), which collect glass and plastic bottles and jars, aluminum and steel food and beverage cans, newspapers, mixed paper, and cardboard. The number of RDOCs has decreased from the fourteen available in 1995, in part due to curbside collection. Due to overwhelming quantities of unrecyclable batteries deposited in the containers, collection of button batteries and nickel-cadmium batteries was discontinued in 1998.

iv. Reporting by Solid Waste Collectors

All waste collectors permitted in Fairfax County are required to report residential recycling tonnages on an annual basis to the County. Because haulers consider specific customer information to be proprietary, the County is not able to measure hauler participation rates effectively. For Calendar Year 2000, private haulers were requested to include tons of waste disposed and to calculate a recycling rate for their residential service as part of their annual recycling report. Since this information is not required by statute, compliance with this request was minimal. Since the County does not have information on the customer base served by any individual private hauler, the County is unable to determine per household participation rates for private haulers' customers.

**b. Commercial Programs**

i. Mandatory Commercial Recycling Programs

The commercial recycling program is mandatory based on thresholds. Those commercial properties generating 100 tons of waste annually or housing 200 office workers were required to recycle the principle recyclable material in the waste stream and to report annually to the County. The County's own agency recycling program uses the threshold system, but also includes additional sites based on collection logistics and market conditions.

ii. Voluntary Commercial Source Reduction Programs

The County has promoted source reduction within the private sector by using case studies to publicize the efforts and cost savings realized by businesses that have set up successful source reduction programs. Technical assistance is provided to the private sector to assist them in the development of voluntary and mandatory recycling and source reduction programs. Successful public/private partnership activities include the production of the *Business Recycling Makes Sen$e* video and participation in the County Chamber of Commerce's annual trade show, "Innovations". Each year, the Business Advisory Committee sponsors a booth and exhibit and, with assistance from County staff, develops and distributes information packets on reuse, source reduction, and buying recycled.

The effect of reuse on the waste generation rate can not be determined accurately at this time. To date, businesses have reported statistical data sporadically. An aggressive public awareness campaign could educate the public on the importance

of reporting reuse, thus enabling an accurate determination of its impacts.

**c. County and Regional Agencies**[9]

The Northern Virginia Waste Management Board (NVWMB) was created in 1989 to promote regional approaches and solutions to recycling and waste management issues. In addition to serving as an intergovernmental liaison, staff provides extensive legislative and regulatory support to local governments. Based on the NVWMB's recommendations, legislation was introduced into the 2001 General Assembly to establish a State-wide used oil and antifreeze management program and to allow localities by ordinance to prohibit trash trucks from parking anywhere except specially designated areas. Both measures passed and were signed into law by the Governor.

**d. Public Education**

The County maintains an automated recycling information line (703-324-5052) for citizen access to recycling opportunity information. In addition, County staff members are available for speaking engagements and participate in local events such as the Fairfax Fair and Fall for Fairfax. The County prepares public service announcements and programs for cable TV and produces flyers and brochures to educate the public. Nontraditional techniques also are in use, including development of multilingual materials and graphic icons. The County received pro bono assistance from such diverse organizations as the National Recycling Coalition and a local recycling business, ERI. They have assisted in the review of recycling public relations campaigns.

Fairfax County promotes reuse through a variety of mechanisms, including publications, videos, and special events for citizens and businesses. Reuse ideas are offered to residents through publications such as the *Thrift Shop List*. A source reduction video was produced to encourage people to practice reuse options, such as renting infrequently used equipment rather than purchasing it or repairing household goods for donation to charitable organizations.

# C. LEGISLATIVE UPDATE

**HB 681 Local recycling and waste disposal.**
Authorizes localities to grant incentives to encourage recycling. Signed into law 4/2/00

**HB 981 Solid waste management facilities.**
Requires that applications for permit amendments or variances allowing certain

nonhazardous industrial waste facilities to expand contain the same information as is required for an application for a new solid waste management facility permit. Signed into law 4/12/00.

**HB 1022 Financial assurance for waste facilities.**
Prohibits the owner or operator of a solid waste facility from reliance on captive insurers, approved surplus line insurers and risk retention groups as a means of assuring that he or she will have the financial capacity to properly close and care for the site after closure. Signed into law 3/28/00.

**HB 1023 Financial responsibility for solid waste management facilities.**
Requires the Virginia Waste Management Board to include facilities receiving solid waste from a ship, barge or other vessel in regulations which ensure that, if a solid waste management facility is abandoned, the costs associated with protecting the public health and safety from the consequences of such abandonment may be recovered from the person abandoning the facility. Signed into law 3/28/00.

**HB 1228 Landfill closure.**
Requires disposal areas of landfills that are not equipped with liner and leachate control systems meeting the current requirements of Waste Management Board regulations to be closed by 2020. Signed into law 4/7/00.

**HJ 118 Study; reduction of solid waste.**
Establishes an 11-member joint subcommittee to examine strategies to reduce the amount of solid waste being deposited in Virginia's landfills. The joint subcommittee is to examine ways in which the State can encourage the use of alternative waste management practices in order to meet the goal of a 25 percent reduction in the amount of solid waste deposited in Virginia's landfills by 2005. Letter sent 2/11/00 from the House to the Secretary of Natural Resources

**HJ 214 Memorializing Congress; importation of waste.**
Urges Congress to enact legislation giving states and localities the power to control the importation of waste into their jurisdictions. Passed by House as amended by Senate, 2/25/00.

**HJ 385 Importation of municipal solid waste.**
Urges the Congress of the United States to enact the Solid Waste Interstate Transportation and Local Authority Act of 1999 (HR 1190) that gives state and local governments additional authority to regulate the importation of municipal solid waste into their jurisdictions. House bill passed by Senate, 2/23/00.

**SB 317 Littering; illegal trash dumping.**
Provides that an individual who litters illegally or dumps trash or garbage is subject to a fine of between $250 to $2,500 and a jail sentence of up to 12 months, either or both. Currently, a person who litters or dumps trash is subject to a Class 1 misdemeanor. Signed into law 3/6/00.

**SJ 133 Study; reduction of solid waste.**
Directs the Commission on the Future of Virginia's Environment to examine strategies to reduce the amount of solid waste being deposited in Virginia's landfills. The joint subcommittee is to examine ways in which the State can encourage the use of alternative waste management practices in order to meet the goal of a 25 percent reduction in the amount of solid waste deposited in Virginia's landfills by 2005 . Letter sent 3/6/00 from the House to the Commission on the Future of VA's Environment.

# D. RECOMMENDATION

1. EQAC is strongly opposed to the use of surplus funding to subsidize tipping fees in the County. While we recognize that the County is concerned about the potential to fall below its contractual requirement to supply 930,750 tons of solid waste per year to the E/RRF, the current approach is not sustainable. Moreover, in coming years, this action may have negative impacts on recycling programs within the County and may lead to severe budget cuts for such programs.

# LIST OF REFERENCES

[1] Unless otherwise noted, information for 2000 taken directly from e-mail to Noel Kaplan, Department of Planning and Zoning, from Joyce Doughty, Director, Division of Solid Waste Disposal and Resource Recovery, July 9, 2001. Additional summary information from previous editions of the *Annual Report on the Environment.*

[2] Fairfax County Department of Public Works and Environmental Services, *2000 Annual Groundwater Monitoring Report, I-95 Sanitary Landfill, Lorton, VA*, February 2001.

[3] Unless otherwise noted, information for 2000 taken directly from e-mail to Noel Kaplan, Department of Planning and Zoning, from Joyce Doughty, Director, Division of Solid Waste Disposal and Resource Recovery, July 9, 2001. Additional summary information from previous editions of the *Annual Report on the Environment.*

[4]Information for 2000 taken directly from e-mail to Noel Kaplan, Department of Planning and Zoning, from Joyce Doughty, Director, Division of Solid Waste Disposal and Resource Recovery, July 9, 2001. Additional summary information from previous editions of the *Annual Report on the Environment.*

[5] Data provided by UOSA staff, undated.

[6]All data in this section taken directly from Division of Solid Waste Disposal and Recovery, *Solid Waste Disposal Status for EQAC's 1999 Report*, unless otherwise noted.

[7] Source: U.S. EPA, Permit Compliance System, Water Discharge Permit Query system, (www.epa.gov/enviro/html/pcs_query_java.html). Search conducted September, 2001. Data are for December 31, 2000 and reflect average concentrations unless otherwise noted.

[8]Data taken directly from Memorandum to Noel Kaplan, Senior Environmental Planner, Department of Planning and Zoning, from Jerry A. Hubbard, Director, Division of Solid Waste Collection and Recycling dated July 6, 2001. Additional summary information from previous editions of the *Annual Report on the Environment.*

[9]Information taken directly from "Update of Northern Virginia Regional Commission Activities for the Fairfax County Environmental Quality Advisory Council," David Bulova, Director of Environmental Services, May 25, 2001.

ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER VI**

# HAZARDOUS MATERIALS

# VI. HAZARDOUS MATERIALS

## A. ISSUES AND OVERVIEW

### 1. Overview

Fairfax County hazardous materials concerns may be considered less significant as compared to other jurisdictions; the industrial base within the County is relatively "clean". Nevertheless, the County does have its share of problems. Hazardous materials incidents involving spills, leaks, transportation accidents, ruptures, or other types of emergency discharges are the main concern. Also of concern is the use and disposal of hazardous materials in either daily household activities or by small quantity commercial generators. The third problem is the clean up and regulation of hazardous materials.

Although the news media is constantly reporting industrial and transportation related hazardous materials incidents, there is a general lack of awareness by the public of health and safety risks associated with the use, storage, and disposal of common household hazardous materials. Educating the public on the implications of these hazardous materials on people's lives remains a significant goal.

### 2. Hazardous Materials Incidents

The Fire and Rescue Department's Operations Division and/or Hazardous Materials and Investigative Services Section responds to all reported incidents of hazardous materials releases, spills, and discharges. Fairfax County maintains a well-equipped hazardous materials response team. The primary unit operates from Fire Station 34 in Oakton, and three satellite units are stationed at Fire Station 1 in McLean, Fire Station 11 in Alexandria, and Fire Station 26 in Springfield. These units are strategically positioned to provide rapid response and adequate coverage throughout Fairfax County. Response personnel are trained and equipped to initiate product control and mitigation measures to prevent or minimize the adverse environmental impact and damage.

The Hazardous Materials Response Team responded to 304 incidents in CY 2000. This included the release of products into the air, water, and soil. The majority of the incidents continue to be hydrocarbon and corrosive releases. In addition, there were hundreds of small releases such as gasoline, diesel fuel, antifreeze, hydraulic fluid, etc. that were handled by first responder units. In CY 2000, the Fire and Rescue Department placed in service a Spill Control Unit at Fire Station 35. This unit carries bulk supplies for spill control, absorption, and containment efforts. The team conducted regular ongoing training sessions as well as exercises with surrounding jurisdictions and state and federal agencies.

The Hazardous Materials and Investigative Services personnel responds to reported incidents and investigates complaints of potential and actual releases, many of a non-emergency nature. During CY 2000, response incidents, which had the potential to discharge hazardous materials into storm drain or surface water, included: 53 improper disposals, 33 pipeline incidents, 64 various types of product releases, and 210 petroleum releases.

In addition to the efforts of the Operations Division and Hazardous Materials Investigative Services Section personnel, the Fire and Rescue Department maintains a contract with a major commercial hazardous materials response company to provide additional support for large-scale incidents. The Fire and Rescue Department is committed to protecting the environment and the citizens through proper enforcement of the code or rapid identification, containment, and cleanup of hazardous materials incidents. (1)

## 3. Hazardous Materials in the Waste Stream

The disposal of household and small quantities of non-household hazardous materials into the waste stream continues to be a concern. Unlike hazardous materials incidents, the immediate impact is not as dangerous. However, the long-term impact can be just as severe. Hazardous materials in the waste stream are contaminating landfills. Sometimes hazardous materials are dumped illegally, which leads to stream and groundwater pollution and soil contamination. Household hazardous wastes are products used in and around the home that are flammable, corrosive, reactive, or toxic. These hazardous materials potentially can cause a safety problem if various household chemicals become mixed when disposed of with the regular trash. By disposing of household hazardous wastes separately, these materials can be properly handled and packaged to minimized exposure to potentially harmful chemicals and decrease the likelihood that these chemicals will enter the environment.

### a. Used Automotive Oil and Fluids

A recent year-long study by the Northern Virginia Regional Commission (NVRC, formerly the Northern Virginia Planning District Commission) for the Virginia Department of Environmental Quality estimates that approximately three to 4.5 million gallons of used oil and approximately one million gallons of antifreeze are "lost" in the environment each year through improper disposal by do-it-yourselfers", or DIYers. DIYers change their own automotive fluids (including oil, oil filters, and antifreeze) and account for 40% to 50% of those owning passenger cars. Only 15% to 30% of DIYers are believed to properly recycle or dispose of used oil. One percent or less of DIYers recycle oil filters.

This study resulted in a recommendation to re-establish a State-wide used oil recycling program aimed capturing what amounts to the 1989 Exxon Valdez oil

spill every four years. As a part of the study, NVRC developed a database of all known collection centers in Virginia – 471 private and 125 public. The study also revealed that there are about the same number of collection facilities in 1999 as in the late 1980s; however, the volume of oil generated has increased roughly 100,000 gallons per year because of more cars on the road. Convenience and public education were found to be major factors in whether DIYers recycle or not. (2)

### b. Dumping into Storm Drains

Storm drains carry rain water runoff from streets. This water is not treated and goes directly into local streams. All streams in Fairfax County eventually flow into the Potomac River, which empties into the Chesapeake Bay. Anything dumped down a storm drain will follow the same path as the rain water. (3)

The cleaning-up of animal wastes and the disposal of such wastes down storm drains, as well as the disposal of leaves down storm drains, are attempts at doing a service that have the effect of introducing pollutants directly into County streams. There are also deliberate disposals of chemicals, oils and other items into the storm drains as "out-of-site, out-of-mind." In either situation, there is a misperception that the storm drains are part of the County sewage system and that the disposal of materials down these drains does not provide a direct impact to the environment.

## 4. Pipelines

The following summary has been taken from the fall, 2000 edition of "LEPC Connection: A Virginia Local Emergency Planning Committee Newsletter:"

> "More than 3,000 companies operate some 1.9 million miles of natural gas and hazardous liquid pipelines in the United States. The pipeline network includes 302,000 miles of natural gas transmission pipelines operated by 1,220 firms, and 155,000 miles are hazardous liquid transmission pipelines operated by 220 outfits. In addition to transmission pipelines, 94 liquefied natural gas facilities operate in the United States." (4)

Pipelines traverse Fairfax County carrying refined petroleum for two companies and natural gas for three companies. The regulation of pipeline design, construction, operation and maintenance to ensure safe transportation of hazardous liquids and natural gas is handled by the Office of Pipeline Safety in the U.S. Department of Transportation. (4)

# B. PROGRAMS, PROJECTS, AND ANALYSES

## 1. Fairfax Joint Local Emergency Planning Committee (FJLEPC)

The FJLEPC is comprised of representatives of the City of Fairfax, the towns of Herndon and Vienna, Fairfax County, and local business and citizens groups. The Virginia Emergency Response Council appoints representatives. LEPCs are required by Section 301[c] of Title III of the Emergency Planning and Community Right-to-Know Act (EPCRA), a freestanding provision of the Superfund Amendments and Reauthorization Act of 1986 (SARA). The committee is responsible for preparing and annually updating the Hazardous Material Emergency Response Plan (HMERP). The FJLEPC also is required to compile information on the facilities within its jurisdiction that either use, store, or manufacture hazardous materials in amounts equal to or greater than the threshold planning quantities (TPQs). Businesses with extremely hazardous materials with over the TPQ amounts must prepare a Hazardous Materials Response Plan. The plan consists of notification procedures in the event of an incident, on site means of detecting incidents, evacuation plans, clean-up resources, and identification of parties responsible for the site.

In 2000, FJLEPC began increasing education and outreach to the public. Information is disseminated through fliers, FJLEPC's newsletter, and its web site: www.lepcfairfax.org. Future plans include speaking to businesses and community groups.

## 2. Railroad Transportation Plan

The Hazardous Materials Systems Division of CSX Transportation has a hazardous material emergency response plan. A written copy of that plan is on file with FJLEPC and the Fairfax County Fire & Rescue Hazmat Station 34. The web site for CSX is: www.csx.com

## 3. Storm Drain Stenciling Program

The Northern Virginia Soil and Water Conservation District (NVSWCD) has a Storm Drain Stenciling Program which encourages youth and community groups to educate the public about the dangers of dumping anything into storm drains. This is a two-part program that includes education and stenciling of the drains. The mandatory educational component must be completed prior to stenciling and includes distributing flyers to all homes in the neighborhood regarding how to properly dispose of household and pet waste, yard debris, and used motor oil. Trained volunteers then stencil "Dumping Pollutes – Drains to Stream" on storm water inlets in pre-approved Virginia Department of Transportation (VDOT) areas. This program has proven to be an effective, low-cost method of educating large segments of the population about water

quality problems. Last year NVSWCD reported that more than 900 households were educated with this program. (3)

### 4. Household Hazardous Waste Program (HHW)

Fairfax County operates permanent HHW collection centers as a part of its recycling program for residents of Fairfax County. Information on the locations, hours of operation, types of wastes accepted and how to dispose of the wastes can be found on the County's web site www.co.fairfax.va.us. This information can be found under Public Works and Utilities or under environment.

Participation in the HHW collection program has resulted in many items being disposed of at the centers that are not hazardous waste. In addition to the confusion of what should be recycled as HHW, the inconvenience of not having collection sites located throughout the County may be affecting participation.

### 5. Business Wastes

Large businesses with 200+ people or that produce 100+ tons of solid waste annually must recycle their "principal recyclable materials". All other businesses are encouraged to recycle their office paper, cardboard, aluminum beverage cans, newspapers, and any other recyclable materials accepted at local recycling drop-off centers. More information is available on the County's web site. (5)

The Conditionally Exempt Small Quantity Generator (CESQG) program has been suspended. Fairfax County can no longer accept commercial hazardous waste under this program. For more information and a list of commercial hazardous waste disposal companies, access the County's web site. (6)

## C. LEGISLATIVE UPDATE

Virginia H.B. 1030 was passed March 6, 2000 (effective July 1, 2000) amending the Code of Virginia (27-34.2:1) to grant Fire Marshals the authority to investigate incidents involving hazardous materials.

## D. RECOMMENDATIONS

1. EQAC continues to be very concerned about the suspension of the Conditionally Exempt Small Quantity Generator (CESQG) program. The CESQG program served to remove from the waste stream small quantities of hazardous wastes that would otherwise be incinerated in the E/RRF. EQAC strongly encourages the Board of Supervisors to determine mechanisms through which this program can be reinstated.

2. EQAC recommends an aggressive public education campaign on how to properly dispose of household/residential, commercial, and industrial hazardous wastes. A "How To" chart that can be easily read and kept for continued reference is suggested.

# LIST OF REFERENCES


1. Memorandum from Chief Edward L. Stinnette, Fairfax County Fire and Rescue Department, May 23, 2001.

2. Northern Virginia Planning District Commission, NVironment, Vol. 12, Number 1, Fall 1999, p. 1.

3. Northern Virginia Soil & Water Conservation District, *1998-1999 Annual Report*, page 7.

4. LEPC Connection: A Virginia Local Emergency Planning Committee Newsletter, Fall 2000, p. 1

5. Fairfax County Web site: www.co.fairfax.va/gov/dpwes/recycling/new-your_office.html

6. Fairfax County Web site: www.co.fairfax.va/gov/dpwes/trash/disposal_Hazcommer.htm

7. Fairfax Joint Local Emergency Planning Committee

8. Previous EQAC authors of this chapter and material

**CHAPTER VII**

# NOISE, LIGHT POLLUTION, AND VISUAL POLLUTION

# VII. NOISE, LIGHT POLLUTION, AND VISUAL POLLUTION

## A. NOISE

### 1. Overview

Noise is, by definition, any undesired sound. Noise is sound at the wrong time and in the wrong place. It has been called the "most impertinent of all form of interruption." The multiple and insidious ill effects of noise constitute an inadequately recognized, baneful influence on the lives of millions of Americans. It disrupts daily activities as well as peace and quiet, and it is as much a form of pollution as air or water pollution. In 1966, the World Health Organization declared noise to be a significant health threat. Although permanent hearing loss is the most obvious noise-related health issue, exposure to noise can cause many other health problems. Exposure to excessive noise levels can cause psychological and physiological damage leading to stress, high blood pressure, sleeplessness, distraction, and lowered work productivity. Noise levels need not be excessive to cause such havoc. Sustained noise at any level may result in physiological changes in sleep, blood pressure, and digestion.

Noise can even affect social behavior and cognitive development. Recent studies by Cornell University examining the impact of aircraft noise on children's health found higher systolic and diastolic pressure in children living near Los Angeles Airport when compared to those living farther away. A 1995 study by the University of London found relationship between chronic noise exposure and elevated neuroendocrine and cardiovascular measures for children living near Munich International Airport. A 1997 study found that children exposed to chronic airport noise lag behind in reading ability, cognition, and language acquisition skills.

Government studies have pointed out the most frequent complaint Americans have about their neighborhood is not crime but noise. Nevertheless, the two largest sources of noise pollution -- airport noise and vehicular traffic noise, are growing at a rate of three to five percent annually. One need only to check the Noise Pollution Clearinghouse web site (www.nonoise.org) to view thousands of news stories dealing with lawsuits and community battles over noise. As technology and population continue to grow, one can assume that noise-related controversies will only increase.

### 2. Noise Measurement

Noise is expressed in decibels (dB), the basic unit for the measurement of sound. Sound itself is molecular waves caused by an object in motion that forms vibrations that travel

through a medium such as air. The human ear only hears sound waves between certain frequencies (the number of time per second the sine wave of sound repeats itself or that the sine wave of a vibrating object repeats itself). Because the ear has a different sensitivity to noise sources than a microphone, a logarithmic weighting curve, the A-weighting scale, has been developed for use in approximating the sensitivity of the average human ear's perception of loudness. Therefore, noise levels related to human impacts are measured and expressed in terms of A-weighted decibels (dBA). Some examples of noise levels are:

| | |
|---|---|
| Threshold of pain | 130 decibels |
| Riveting on steel plate at 6 feet | 120 decibels (deafening) |
| Noisy urban street | 90 decibels (very loud) |
| Continuous exposure likely to degrade hearing | 80 decibels |
| Auto at 50 feet at 50 mph | 70 decibels (loud) |
| Average office | 50 decibels (moderate) |
| Quiet living room | 20 decibels (faint) |

To assist in the assessment of noise levels most representative of particular noise sources and environments, various government agencies and localities have developed measurement scales or noise descriptors for averaging, calculating, and representing noise levels. To simplify the noise-measuring task, federal government scientists created the Leq equivalent noise levels for a given period. The Leq basically takes each noise event and devolves it into a one-second event with appropriate amplitude. All these one-second events during the day (24 hours) are then summed up to create an average for the day. However, because of the greater impact that noise has during evening hours, a 10 dB penalty to the Leq is applied to the nighttime hours from 10 p.m. to 7 a.m. The measurement is the basic level used in Fairfax County for land use planning purposes. This is referred to as the Day-Night Average Sound Level or DNL. California and some European countries use a Community Noise Equivalent Level (CNEL) which includes a 5 dBA penalty during the hours of 7 p.m. to 10 p.m. in addition to the 10 dB DNL nighttime penalty as a recognition of the importance of communication and relaxation during evening hours.

Because noise-level scales are logarithmic, values cannot be directly added to each other to calculate a total combined noise level. Two noise sources producing equal sound levels at a given location will produce a composite sound level that is 3 dBA greater than either sound alone. Thus, a doubling in the noise level will equate to an increase of 3 dBA. When two values differ by 10 dBA, the composite noise level will be only 0.4 dBA greater than that of the louder noise source alone.

Because noise consists of sound waves traveling through the air, noise levels decrease with distance from the noise source. With no intervening obstruction, noise will

decrease approximately 6 dBA for every doubling of distance away from the source. However, when the noise source is essentially a continuous line, such as vehicle traffic on a highway, noise levels generally will decrease about 3 dBA for every doubling of distance.

When intervening land or structural features are present with a distance between a noise source and a receptor, noise values can be affected by these features. If intervening ground is covered with noise absorption materials, such tall grasses, shrubs, or trees, the reduction in noise levels will be somewhat greater that the 3 dBA value noted above for traffic noise. Structural barriers and geographic features can cause sound waves to be absorbed or to bounce and reflect in different directions, thereby affecting the noise at a particular receptor. Atmospheric conditions can also affect the degree to which sound is reduced over distance.

Several federal and state agencies have developed guidelines for evaluating land use compatibility for applicable noise level ranges, based on characteristics of noise sources and receptors. The Federal Noise Control Act of 1972 established a requirement that all federal agencies develop programs to promote an environment free of noise that threatens public health or welfare. Although the Environmental Protection Agency (EPA) has responsibility under the act, each federal agency has the authority to adopt noise regulations pertaining to that particular agency's activities, e.g., the Federal Highway Administration sets noise standards for federally funded transportation projects while the Federal Aviation Administration (FAA) sets aircraft noise standards.

An important element of the Federal Noise Control Act is that it directs all federal agencies to comply with applicable federal, interstate, state, and local noise control regulations. Many states have guidelines and standards for evaluating noise impacts and requirements to incorporate mitigation measures into proposed projects or actions. Municipalities also establish local noise guidelines, usually within the framework of a comprehensive plan through noise-related ordinances. The Fairfax County Comprehensive Plan establishes noise-related goals and polices, and describes the general noise environment. The County also has a noise ordinance with recommends maximum expected noise levels for various land use categories.

## 3. Emerging Issues

### a. The Potomac Consolidated TRACON Project

The FAA decided to streamline its current operations in the Potomac region by consolidating four Terminal Radar Approach Control (TRACON) facilities into a single integrated operation. Ground was broken for the new installation on March 6, 2000. This new integrated TRACON is at Vint Hill, Fauquier County (near

Warrenton, Virginia). Construction is expected to be complete in 2001 and facility commissioning is expected in 2002.

TRACON facilities are radar air traffic control facilities that control air traffic from about five to fifty miles out from airports. By replacing the existing four TRACON facilities, the FAA argues that they can simplify operations and reduce cost -- including the better management and control of airspace. The FAA, in implementing this project, is using a two-tiered approach to the Environmental Impact Statement (EIS). The first phase is the actual construction of the Fauquier County facility. The final EIS for this first tier was issued in April 1999 with the finding that the proposed actions were consistent with existing national environmental policies and objectives.

The second phase of the TRACON project focuses on the actual redesign of the airspace that will be controlled by the Vint Hill facility. The FAA has stated that such a redesign would benefit the region by allowing both arriving and departing flights to stay at higher altitudes for longer periods of time. The use of higher altitudes for longer periods of time will reduce overall aircraft noise as well as the length of time the noise can be heard. A draft EIS for this second phase is expected in 2001.

Because of the potential impact on Fairfax County citizen's and their exposure to aircraft noise, Fairfax County needs to study the EIS when issued and provide comments.

**b. Helicopter Noise**

A meeting of the Helicopter Noise Working Group, under the aegis of the Committee on Noise Abatement at National and Dulles Airports (CONANDA, a committee of the Metropolitan Washington Council of Governments), took place on March 1, 2000. Items discussed included a pending MOU between the Army, Navy, Air Force, and Marines that dealt with flight patterns in southwest Washington, near Haines Point. Language in the MOU states that moving the flight pattern away from the neighborhood would significantly help the community. Next steps in addressing helicopter noise include the mapping of hot spots -- high complaint areas identified by citizens due to helicopters. Subsequent meeting of this Working group continued to address hot spots, including using GIS to map these areas of high citizen complaints.

### c. W. H. Ford Aviation Investment and Reform Act of the 21st Century (AIR 21)

As reported in last year's Annual Report on the Environment, Congress passed AIR 21. This resulted in the creation of 24 new slots at Reagan National Airport. Twelve of these are for flights inside the 1,250 mile perimeter and the other twelve are for flights outside (i.e., greater than) the 1,250 mile perimeter.

### d. Federal Aviation Regulation (FAR) Part 150

Part 150 is an FAA program that makes grant money available to airport proprietors to undertake noise and land use compatibility planning. The Metropolitan Washington Airports Authority (MWAA) has initiated a major update of the Noise Compatibility Study for Ronald Reagan Washington National Airport in accordance with the provisions of FAR Part 150. The purpose of this study is to forecast future noise contours at Reagan National and propose abatement actions to mitigate community noise impacts. CONANDA will be working with MWAA throughout the Part 150 study process. The study started the first quarter of 2001 and the process is anticipated to take 18 months.

The Metropolitan Washington Council of Governments (COG) sent a letter to the Fairfax County Board of Supervisors inviting the Board's participation in a Part 150 Advisory Committee. In response, on June 11, 2001, the Board appointed Supervisor Hyland as the Board's representative on this committee and Supervisor Mendelsohn as the alternate.

## 4. Highway Noise

### a. Background

Traffic in the Washington metropolitan area, including Fairfax County, continues to grow with intense residential development in Loudoun and Prince William Counties. The area has ranked second nationally for the worst commuting times behind Los Angeles. As more lanes are added and some new roads are constructed, increased traffic generates more noise that creates demands for noise attenuation or abatement measures. These measures include separating the receiver from the source by distance, constructing barriers/walls or berms, providing landscaping/vegetation, or providing acoustical design solutions. Barriers are the most popular choice. Since 1991, barriers constructed in Fairfax County by the Virginia Department of Transportation have consisted of solid walls of absorptive concrete that, at a minimum, break the lines of sight between vehicles and homes. Although noise barriers have a maximum decibel reduction of 20 decibels, most only provide 10-12 decibel reductions.

### b. State Policy

Virginia adopted its original noise abatement policy in 1989. The policy established criteria for providing noise protection in conjunction with proposed highway projects in the State. Implementation of the policy has aided in the construction of, or construction approval for, more than 100 federally-funded sound barriers. Experience with this policy created considerable feedback from citizens and elected officials. As a result, the Commonwealth Transportation Board decided to evaluate the policy for possible changes. The major source of information used was a survey of 15 State Departments of Transportation in the eastern U.S. The culmination of this process was the adoption of changes to the State policy in November, 1996, which became effective in January, 1997.

The key changes to the policy were to: 1) raise the cost-effectiveness ceiling from $20,000 per protected receptor to $30,000 per protected residential property based other state practices; 2) clarify that Virginia will not participate in any retrofit project along an existing highway when not in conjunction with an improvement for that highway; and 3) add the possibility for third party funding of the amount above the Virginia Department of Transportation's (VDOT's) $30,000 ceiling if the abatement measure otherwise satisfies the criteria.

### c. State Projects in Fairfax County

VDOT's Northern Virginia Office constructed the following sound barriers in FY 00-01:

- Roberts Parkway, Route 6197, one barrier
- Route 28/29 Interchange – between I-66 and Route 28/29 Interchange – construction of 2 barriers
- Springfield Interchange (I95/395/495) – construction of up to 5 barriers
- Baron Cameron Avenue Interchange with Fairfax County – construction of 3 barriers

The following barriers have been approved and construction is anticipated to begin on them in FY 01-02:

- Springfield Interchange (I95/395/495) – barriers not completed in 00-01
- West Ox Road, Route 608, one barrier

#### d. County Practices and Projects

In Fairfax County's *Policy Plan: The Countywide Policy Element of the Comprehensive Plan* (2000 Edition), there is an objective to "minimize human exposure to unhealthful levels of transportation generated noise." It states that new development should not expose residents in their homes to noise in excess of DNL 45 dBA. Because typical residential building materials will reduce noise levels by at least 20 dBA, mitigation is recommended when highway noise is between DNL 65 and 75 dBA. In areas with highway noise exposures exceeding DNL 75 dBA, residential development should not take place.

# B. LIGHT POLLUTION

## 1. Overview

Light pollution, as briefly discussed in earlier EQAC Annual Reports on the Environment, is a general term used to describe light output primarily from exterior (outdoor) sources in commercial, residential, and roadway settings that is excessive in amount and/or that causes harmful glare to be directed into residential neighborhoods or into the path of travel. Light pollution is thus both a safety issue and a quality of life issue. With the increasing urbanization of Fairfax County, exterior (outdoor) lighting and light pollution in its many forms have become pressing issues to our communities. At present, Fairfax County has some regulations regarding exterior lighting, but they are minimal and out of date, since they do not take into account the numerous major advances that have been made in lighting technology in recent years. However, the County is currently drafting a comprehensive ordinance that should materially improve our posture in this area.

## 2. Issues and Problems

The main issues and problems of exterior lighting and light pollution may be summarized as follows:

#### a. Glare

Glare, as defined by the Illuminating Engineering Society of North America (IESNA), falls into three main categories:

i. Disability glare – Disability glare, also known as veiling luminance, is caused by light sources that shine directly into ones eyes and is dangerous because it is blinding.

ii. Discomfort glare – Discomfort glare does not necessarily reduce the ability to see an object, but it produces a sensation of discomfort due to high contrast or non-uniform distribution of light in the field of view.

iii. Nuisance or annoyance glare – Nuisance glare is that which causes complaints such as: "The light is shining in my window."

Glare is a significant and pervasive problem that seriously impairs both safety and quality of life. Glare demands attention in that one's eyes are naturally attracted to bright light, and at night this destroys the eye's dark adaptation, which is a serious driving hazard. Obtrusive lighting by commercial establishments to attract attention is a serious problem, as is selection of inappropriate fixtures for exterior residential lighting. Glare and excessive illumination cast into surrounding residential neighborhoods not only detracts from the quality of life but can make it difficult for pedestrians and homeowners to see their surroundings.

**b. Light trespass**

Light-trespass is the poor control of outdoor lighting such that it crosses property lines and detracts from the property value and quality of life of those whose property is so invaded. It is particularly common where obtrusive commercial lighting is immediately adjacent to residential neighborhoods or when a homeowner uses inappropriate fixtures, light levels, and lighting duration, often in the interest of "security." It is generally categorized in two forms:

i. Adjacent property is illuminated by unwanted light.

ii. Excessive brightness occurs in the normal field of view.

Both of these forms may be present in a given situation.

**c. Security**

Much outdoor lighting is used to provide security. These safety concerns often result in bad lighting rather than real security. One reason often cited for today's bright lights is that high wattage is needed to deter crime. If light is overly bright with excessive glare, it makes it easier for a person to hide in the deep shadows created by objects in the harsh glaring light. This might actually encourage crime rather than discouraging it. The debate as to whether or not additional light provides more safety has been more emotional than factual. Those rigorous studies that have been done reveal no connection between higher lighting levels and lower crime rates. This may be due to people with nefarious intent taking more risks in better lit

areas. For example, the National Institute of Law Enforcement and Criminal Justice found no statistically significant evidence that lighting impacts the level of crime (Upgren, 1996). Thus, the correlation between security lights and reduced crime appears to be nothing more than a popular myth.

**d. Urban sky glow**

Urban sky glow is brightening of the night sky due to manmade lighting that passes upward with the light rays reflected off of submicroscopic dust and water particles in the atmosphere. Although urban sky glow was first noted as a problem by the astronomical community, it is by no means any longer solely an astronomical issue. With the increasing urbanization of many areas of the U.S., all citizens in those areas are now being affected. In Fairfax County, which is now an urban county, improper lighting has seriously degraded the darkness of our local night skies into a pallid luminescence that many of our citizens find objectionable.

**e. Energy usage**

Smart lighting techniques reduce energy consumption and hence the use of fossil fuels. Several engineering estimates suggest that at least 30 percent of outdoor lighting is being wasted through spilling upward and outward rather than being directed downward onto the target area. Also, many installations are greatly over-illuminated as well as being lighted for unnecessary durations, further compounding the energy wastage. Inefficient lighting incurs both direct financial costs and hidden environmental costs. It has been estimated by national organizations studying light pollution that in excess of $8 billion of electricity is being wasted annually on obtrusive and inefficient outdoor lighting (see data from Virginia Outdoor Lighting Task Force and the International Dark-Sky Association). Since electricity generation in the eastern part of this country is almost entirely from fossil fuels, every unnecessary kilowatt of electrical energy generated also produces unnecessary greenhouse gases and acid rain.

## 3. Current County Standards and Regulations

Fairfax County does prescribe limits for the maximum wattage of light sources and for the amount of glare in residential districts. However, these standards do not cover all roadways (particularly main roadways, which are under the jurisdiction of the Virginia Department of Transportation (VDOT)), nor is there any policy regarding residential street lighting. Additionally, the combined effects of glare into residential neighborhoods from sources such as park lights and lights on nearby commercial buildings are not fully addressed.

Fairfax County's *Policy Plan: The Countywide Policy Element of the Comprehensive Plan* (2000 Edition) recognizes the nuisance of light emissions arising from increasing urbanization and recommends that efforts be made to avoid creating sources of glare that interfere with residents' and/or travelers' visual acuity. To put this into practice, the current County Zoning Ordinance lists glare standards. Specifically, it requires that illumination shall not produce glare in residential districts in excess of 0.5 foot candles and that flickering or bright sources of light shall avoid being a nuisance in residential districts. It also prescribes limits for the maximum intensity of light sources as follows:

| SOURCE | INTENSITY | |
|---|---|---|
| | Group I | Group II |
| Bare incandescent bulbs | 15 watts | 40 watts |
| Illuminated buildings | 15 foot candles | 30 foot candles |
| Back lighted or luminous background signs | 150 foot lamberts | 250 foot lamberts |

Group I applies to all residential zoning as well as commercial districts 1 through 4 and industrial districts 1 through 4. Group II is limited to commercial districts 5 through 8 and industrial districts 5 and 6.

## 4. Addressing the Problem

One of the most common street lights in use, the cobra-head fixture, draws 150 watts. A fixture with reflective backing and shielding can direct all light below the horizontal plane with the same illumination of streets and homes and use only 100 watts. The same possibility exists with the popular 175 watt unshielded mercury vapor lamp. Both the 150-watt cobra-head fixture and the 175-watt mercury vapor lamp cast light laterally as well as down. As a result, substantial glare is often cast directly into the eyes of drivers. This glare destroys drivers' dark adaptation, creating potential safety hazards. In many cases the driver is not able to see the roadway any better than he or she would with lower-wattage properly shielded lights, and in many cases his or her vision is much worse. Because they cut down on glare, shielded fixtures not only are safer for drivers, but according to experts (see references) actually make it easier for pedestrians and home owners to see their surroundings.

By redirecting this wasted energy, lower wattage lights provide the same amount of illumination in the areas where it is needed. These fixtures have reflective backing and full cut-off shielding to direct all light below the horizontal plane, with 90 percent of the light directed below an angle of 20 degrees from the horizontal. For example, a 50-watt metal halide lamp with a reflective shield will provide as much illumination below the horizontal plane as the 150-watt cobra-head fixture or the 175-watt unshielded mercury

vapor lamp. These newer types of fixtures, which are recommended by the Illuminating Engineering Society of North America, are widely available and direct all light below the horizontal plane, thereby eliminating lateral glare (see Figure VII-1). It is estimated that it takes only three years of energy savings to recoup the initial investment in these fixtures. The lower wattage fixtures provide energy savings, improved driver safety, better visibility for pedestrians, and an improved ambiance and security for neighborhoods. Several municipalities, such as Tucson, San Diego, and Sanibel Island, Florida, have adopted street lighting ordinances requiring these newer fixtures.

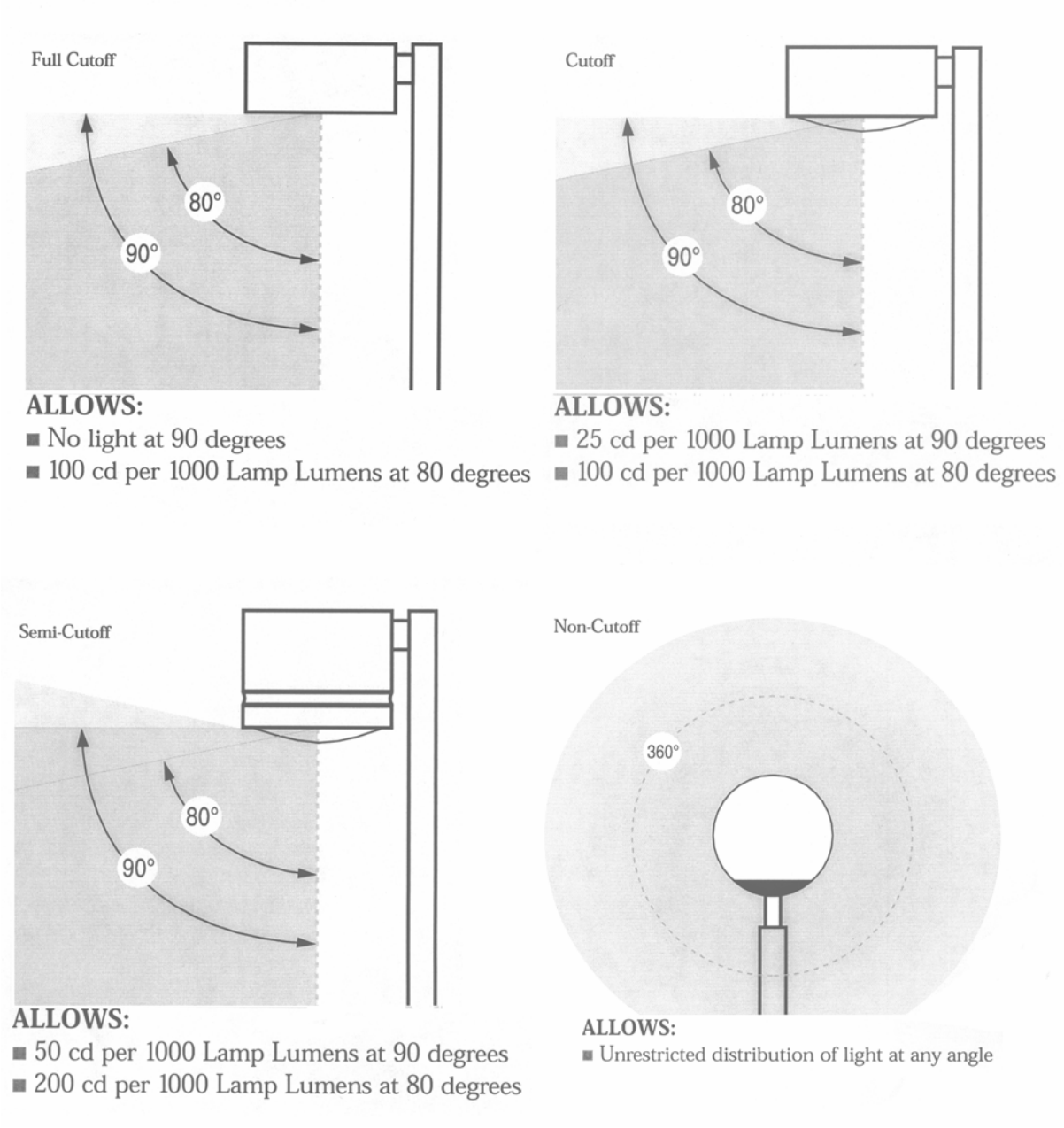
Most security lighting is overdone, with high wattage lights burning from sundown to sunup. As noted earlier, constant levels of illumination tend to be largely ignored because they are commonplace, and they waste a huge amount of energy. The large amount of glare produced by high intensity sources creates shadows that provide hiding places for intruders. Moreover, the constant glare and light trespass onto adjacent properties is a major source of annoyance to their occupants. On the other hand, lights that are activated by motion within a controlled area attract immediate attention and, at the same time, use very little energy and create intrusion on adjacent properties only when such attention is desired. For example, if one is using 300 watts of security lighting for ten hours each night and converts to an infrared motion sensor control that turns on the lights only when there is motion in the controlled area, energy cost is reduced to almost nil. In addition, the cost of the added sensor-control hardware itself can be recovered in as little as two months due to the energy saving. At the same time, security is increased rather than decreased, and glare and light trespass onto adjacent properties is virtually eliminated.

Glare is a significant and pervasive problem, but one that is easily solved by installing fully shielded light fixtures.

Light-trespass is a term of relatively recent origin and denotes: (1) glare that is generated by sources on one property that lie within the normal field of view of the occupants of another property; and (2) light that spills over the boundaries of one property onto another, thereby producing unwanted illumination of it. Increasingly, such light intrusions are being regarded as trespass violations every bit as serious as physical trespass of a person onto the property of another. Such problems can now be readily avoided by the selection of proper fixtures, the selection of proper intensity levels, and the use of timers and sensors/controllers. This is an area where an enhanced and updated County ordinance is badly needed.

Sky-glow is also readily addressed by the selection of properly designed modern fixtures for new installations and by the phased retrofitting of current inadequate installations. The cost of such retrofits is normally recoverable within a reasonable time period (usually estimated at about three years) through efficiently placing all of the light onto the desired area and the lower energy usage.

Figure VII-1
Effects of Cut-off and Non Cut-off Luminaires




(Sources: Paulin, Douglas, *Full Cutoff Lighting: The Benefits*, IESNA web site, and Shaflik, Carl, *Environmental Effects of Roadway Lighting*, Information Sheet Number 125, International Dark-Sky Association, Tucson, Arizona, August 1997.)

Adherence to the following four principles will do much to mitigate or eliminate light pollution.

a. Always illuminate with properly shielded fixtures that prevent the light source itself, and the resultant glare, from entering your field of view. This is done by using cutoff fixtures or supplementary shielding that keeps all of the illumination below the horizontal plane.

b. Do not over-illuminate. Never use more illumination than needed for the task at hand. Using a 400 watt floodlight to illuminate a small parking area or a flag at night is overkill and wastes a great deal of energy. A properly shielded and adjusted 250 watt luminaire (light source + fixture) can illuminate an area just as effectively as an older style 1,000 watt light source.

c. Always aim lighting downward, keeping all of its distribution within the property lines and below the horizontal plane so that it is not a source of glare. Light trespassing onto adjacent properties is unnecessary, inconsiderate, and potentially illegal.

d. Do not burn lighting all night long with the intention of improving security. Using infrared motion sensor-controlled lighting that comes on instantly when there is motion in the designated area is far more effective as a security measure. That rapid change from dark to light draws the immediate attention of everyone in the surrounding area, including security and law enforcement personnel on patrol, and may well be unsettling enough to cause illicit intruders to flee. Lighting that stays on all night draws no special attention and is an enormous waste of energy.

## 5. Public Agency Responsibilities

Compliance with glare standards for residences and other private property is the responsibility of the County's zoning enforcement staff. The County has 18 zoning inspectors (two per magisterial district) to oversee all Zoning Ordinance enforcement. Any enforcement activity dealing with light is complaint-driven. During 1997, the staff received 11 light-related complaints out of a total of 2,287 complaints. The County does not respond to anonymous complaints. Complaints are either filed directly with the Zoning Enforcement Branch or are forwarded by the staff of a member of the Board of Supervisors. The causes of the complaints were usually fast food establishments, security lighting for residences, athletic facilities (e.g., ball fields, driving ranges), or churches. The zoning inspectors typically resolve violations with informal enforcement such as a verbal warning. A notice of violation or civil action can be used if needed. Beyond the general glare standards, the County frequently has been able to impose additional restrictions through the provisions of the special permit and special exception processes.

One of the most onerous sources of light pollution is the obtrusive lighting of commercial and industrial facilities, particularly commercial retail and service establishments. While their desire to attract attention to themselves is understandable, abusive excesses degrade the overall ambiance of our commercial areas and materially degrade the quality of life in adjacent residential neighborhoods. This is exacerbated by the current absence of a comprehensive and carefully drawn ordinance, especially in the areas of glare and light-trespass onto the properties of others. It is of particular concern in the case of "by-right" development where there are no public hearings (e.g., Planning Commission, Board of Zoning Appeals, or Board of Supervisors) at which adjacent property owners and neighborhoods can register their concerns and see approval conditioned on appropriate restrictions. In such "by-right" cases, the initial responsibility would necessarily fall almost entirely upon the Office of Site Development Services of the Department of Public Works and Environmental Services, which reviews all proposed plans before a building permit is issued.

At this time the County has no formal policies regarding street lighting. Some neighborhoods within the County prefer street lighting, while others do not. Whether or not the County provides street lighting is often driven by budget priorities, and unless there is a demonstrable public safety need, the priority for retrofitting a community is usually low. More often, street lighting is addressed in the overall planning of new subdivisions. In these cases, the Office of Site Development Services would have responsibilities for both reviewing the plan and inspecting the implementation of it.

Responsibility for the lighting of main roadways is under the jurisdiction of VDOT. Historically, local communities and neighborhoods have had to deal directly with VDOT over roadway lighting issues. It has proved very difficult to influence VDOT's choice of fixtures and technical standards, even when it can be demonstrated that their proposed implementations will result in unacceptable levels of glare and light trespass in adjacent residential neighborhoods.

It should be noted that the Department of Planning and Zoning is currently reviewing a number of the things discussed and recommended in this report in the process of drafting comprehensive enhancements and revisions to the present very-limited ordinance. It is hoped that this much-improved ordinance will be ready for presentation to the Board of Supervisors for its approval early in 2002.

## 6. Public Education and Awareness Needs

The general public needs to be made aware of the sources and problems of light pollution and of the methods by which these can be best addressed. This can be done in two ways. First, an informative brochure should be prepared that can be made available to individuals, homeowners groups, and community associations. Brochures could be

made available through appropriate County offices and through the district offices of the members of the Board of Supervisors. Second, and perhaps more efficient, is to make the same information available through the County's web site, which has become an exemplary vehicle for distributing the latest information relating to all aspects of County governance and services.

A few jurisdictions in other areas have prepared technical brochures to make architects, contractors, and electricians aware of their lighting codes and specifically describe what their jurisdictions do not permit (e.g., unshielded security lights, angle-directed post or building mounted fixtures, wall packs without shielding or baffling, excessive wattage or unshielded floodlights, light-trespass onto other properties, etc.) and what they recommend. Fairfax County should prepare a brochure of this type to coincide with the introduction of a new ordinance so that the development and contractor communities will be fully aware from the outset of the revised standards and how best to address them.

## 7. Conclusions

The principal means to prevent poor exterior lighting practices is a comprehensive code or ordinance, because this provides an enforceable legal restriction on specific lighting practices that are deemed unacceptable to the community and its quality of life. Numerous jurisdictions have adopted codes and ordinances that have proven very effective in reducing light pollution and preventing light trespass. A properly conceived and well written code will permit all forms of necessary illumination at reasonable intensities, but will require shielding and other measures to prevent light pollution and light trespass. A good code will apply to all forms of outdoor lighting, including streets, highways, and exterior signs, as well as lighting on dwellings, commercial and industrial buildings, parking areas, and construction sites. A good code will also provide for reasonable exceptions for special uses within acceptable time periods and subject to effective standards.

The County needs to work closely with VDOT to achieve better lighting practices on roadways within Fairfax County that are under VDOT jurisdiction. Current VDOT lighting and proposed new installations are regarded as being very intrusive by adjacent neighborhoods.

Much of the security lighting in Fairfax County is poorly conceived, excessive in intensity, and improperly directed and controlled. These deficiencies could be corrected at relatively low initial costs that would be rapidly recovered through energy savings.

Much lighting in residential neighborhoods uses old style fixtures that propagate light trespass into adjacent properties. A new comprehensive code and public awareness campaign could go far toward correcting these problems.

Poor lighting design, particularly in commercial areas, is contributing to excessive and highly objectionable sky-glow. A new code and retrofitting or adjustment of fixtures could eliminate the worst of this effect.

# C. VISUAL POLLUTION

EQAC is not reporting on visual pollution issues this year. EQAC reiterates its recommendations from the 2000 Annual Report on the Environment, noting that the newly formed Countywide Sign Task Force will be addressing these recommendations.

# D. RECOMMENDATIONS

**Noise**

1. EQAC recommends that the Board of Supervisors continue to monitor the TRACON project in order to ascertain whether changes in airspace redesign will have a negative impact on Fairfax County.

2. EQAC recommends that the Board of Supervisors investigate and establish zoning and noise requirements to insure that the possibility of commercial helicopter service in Fairfax County does not result in an intolerable rise in aircraft noise and citizen annoyance levels. It appears that the current regulatory framework for helicopters is either inadequate or non-existent. EQAC further recommends that the Fairfax County continue to participate in the CONANDA Helicopter Noise Working Group with the goal of identifying and mitigating the impact of all helicopter noise on Fairfax County citizens.

3. EQAC recommends that the Board of Supervisors closely track and continue to participate in the update of the Noise Compatibility Study for Ronald Reagan Washington National Airport in accordance with the provisions of FAR Part 150. EQAC notes that the Board of Supervisors initially addressed this recommendation in its June 11, 2001 action in appointing Supervisor Hyland to the Part 150 Advisory Committee. EQAC recommends that Fairfax County participate in all levels of committees and subcommittees associated with this study.

**Light Pollution**

4. EQAC recommends that the Board of Supervisors direct the Department of Planning and Zoning to move with all deliberate speed in developing a comprehensive ordinance to address lighting standards and practices in Fairfax County and the problems of light pollution.

5. EQAC recommends that the Board of Supervisors direct that all future exterior lighting fixtures installed in Fairfax County follow the recommendation of the Illuminating Engineering Society of North America that most lighting fixtures direct all light below the horizontal plane.

6. EQAC recommends that the Board of Supervisors direct that all older lighting fixtures under County control that do not meet the above standard be replaced on a phased basis with these newer recommended fixtures. EQAC notes that these steps will lead to significantly lower energy costs that will recoup the costs of the changeover in a reasonable period of time.

7. EQAC recommends that the Board of Supervisors work with VDOT and Virginia elected officials to replace existing fixtures on our roadways (under the control of VDOT) with the same type of fixtures recommended in recommendation #6.

8. EQAC recommends that the Board of Supervisors direct the County staff to prepare both a printed brochure and an item on the County web site to promote public awareness of issues, problems, and solutions connected with illumination and light pollution. EQAC further recommends that the Board of Supervisors direct that a technical brochure be prepared for the education of architects, contractors, electricians, and builders as to what the County permits and does not permit in the field of illumination. Both of the above items should be made available at the time a comprehensive illumination ordinance is adopted by the Board.

**Visual Pollution**

9. EQAC recommends that the Board of Supervisors immediately negotiate and execute a similar agreement to that of Prince William County with VDOT such that VDOT would delegate enforcement authority, including penalties, to the County regarding illegal signs in VDOT rights of way. Preliminary steps such as a public hearing may be needed.

10. EQAC recommends that the Board of Supervisors use a multimedia approach to make citizens aware of Title 48 (Virginia's nuisance statute), as has been done in Loudoun County, and to advise and enlist the cooperation of the Fairfax County Commonwealth Attorney's Office.

11. EQAC repeats its recommendation from 1999 that the Board of Supervisors authorize the use of trained and certified volunteers to remove illegal signs from public property or the right-of-way. The volunteers would be certified by magisterial district and display appropriate identification. This would require approval from VDOT using its Adopt-a-Highway authority.

12. EQAC repeats its recommendation that the Board of Supervisors request the Commonwealth Attorney's Office and the Virginia courts to sentence more non-violent offenders to community service to assist in litter and illegal sign removal. In turn, the Board of Supervisors should request the Sheriff's Department to expand the existing community services program to collect and dispose of illegal signs.

13. EQAC repeats its recommendation that the Board of Supervisors authorize the hiring of additional employees to address illegal signs in conjunction with a new County/VDOT agreement as noted above. A high priority should be given to this effort. To this end, a more enforcement-oriented posture needs to be used to create more deterrence among advertisers. This should include maximum use of the $100 per sign authority, full reimbursement for removal actions, prosecution of repeat offenders, and active use of the media to make clear that such a practice will not be tolerated. As part of this, the Zoning Enforcement Branch should begin to document all activities on a quarterly basis by magisterial district.

# LIST OF REFERENCES

## Noise

Fairfax County, Virginia, *Policy Plan: The Countywide Policy Element of the Comprehensive Plan*, 2000 Edition.

*Annual Report on the Environment 2000*, Environmental Quality Advisory Council, Fairfax County, Virginia.

*Meeting Highlights, Committee on Noise Abatement at National and Dulles Airports*, Metropolitan Washington Council of Governments, Washington, DC, March 8, 2000.

*Meeting Highlights, Committee on Noise Abatement at National and Dulles Airports*, Metropolitan Washington Council of Governments, Washington, DC, January 10, 2001

*Meeting Highlights, Committee on Noise Abatement at National and Dulles Airports*, Metropolitan Washington Council of Governments, Washington, DC, March 14, 2001.

*Metropolitan Washington Council of Governments (COG) Part 150 Advisory Committee Regarding Noise Abatement at Ronald Reagan Washington National Airport*, Board Matters - Part A, page 2, Minutes of the Fairfax County Board of Supervisors, June 11, 2001.

*Preliminary Scope of Work for Community Outreach Survey as Input to the Ronald Reagan Washington National Airport PART 150 Update Submitted to: Federal Aviation Administration through The Metropolitan Washington Airports Authority*, Metropolitan Washington Council of Governments, Washington, DC, May 3, 2001.

## Light Pollution

Arthur R. Upgren, *Night Blindness*, The Amicus Journal, Winter 1996, page 22-25.

*Examples of Good and Bad Lighting Fixtures*, Information Sheet Number 122, International Dark-Sky Association, Tucson, Arizona, May 1997.

Douglas Paulin, *Full Cutoff Lighting: The Benefits*, (corrected version), Illuminating Engineering Society of North America web site, http://www.iesna.org/.

Shaflik, Carl, *Environmental Effects of Roadway Lighting,* Information Sheet Number 125, International Dark-Sky Association, Tucson, Arizona, August 1997.

*Some Lighting Myths*, Information Sheet Number 42, International Dark-Sky Association, Tucson, Arizona, January 1991.

Fairfax County, Virginia, *Policy Plan: The Countywide Policy Element of the Comprehensive Plan*, 2000 Edition.

Fairfax County, Virginia, Zoning Ordinance (Chapter 112 of the *Fairfax County Code*)

Illuminating Engineering Society of North America web site, http://www.iesna.org/. (There are numerous subsidiary and related web sites

International Dark-Sky Association web site, http://www.darksky.org/

National Electrical Manufacturers Association web site, http://www.nema.org/. (Particularly see their White Paper on Outdoor Lighting Code Issues.)

Virginia Outdoor Lighting Taskforce (VOLT) web site, http://www.volt.org/

ANNUAL REPORT ON THE ENVIRONMENT

**CHAPTER VIII**

# LAND USE AND TRANSPORTATION

# VIII. LAND USE AND TRANSPORTATION

## A. ISSUES AND OVERVIEW

The linkage between land use and transportation is similar to the chicken and the egg—which comes first? While there is no real answer, there needs to be coordination during the planning phase, as well as infrastructure development. What comes first should not be the debate; rather, the discussion should acknowledge the interdependency between land use and transportation and should seek ways to integrate them into a comprehensive plan.

We tend to deal with mobility and livability as separate, often competing, concepts. While we have institutionalized measures of traffic congestion (volume-to-capacity, average travel speed, and vehicle hours of delay), we have too often ignored measures of livability and community character—those factors that determine the quality of the places we are striving to reach so quickly.[1] A growing number of communities are attempting to fundamentally change the process so that land use and transportation are better linked, bringing the concepts of mobility and livable communities into a single focus. With efforts to create pedestrian-and-transit friendly streets, redevelop old shopping malls into mixed-use walkable town centers, and encourage infill residential development, communities of all sizes are beginning to consider transportation and land use as part of an interrelated system in which mobility and livability are in balance.[2]

A recent report by the Surface Transportation Policy Project (STPP) has found that increasing road capacity leads to increased traffic loads. STPP found that every ten percent (10%) increase in the highway network results in a five point three percent (5.3%) increase in the amount of driving, *over and above any increase caused by population growth or other factors*. In addition, the analysis concludes that road building has not been an effective congestion-fighting measure. In fact, STPP found that those metropolitan areas that added the most highway space per person saw congestion levels rise at a slightly higher rate than areas that added few roads.[3]

County residents are well aware of the length of time it takes to travel in and around the County. This travel time increases each year with an increase in the number of cars per household and an increase in the number of "non-work related" trips. One method used to decrease the amount of traffic in an area is to promote the concentration of residential and commercial development along "transportation" corridors. This is in evidence in the Franconia/Springfield Metro area. Mixed use developments, business and residential, are being built as well as increased parking space at the Metro station.

While many directions can be taken to incorporate land use and transportation into the County's Comprehensive Plan, EQAC salutes the Transportation Coordination Council (TCC) of Northern Virginia for its insight into this complicated issue. In March, 2001, the TCC issued a report entitled "The Alternative Transportation and Land Use Activity

Strategies Study." This comprehensive study recommends that future projects be evaluated based on a set of guidelines stemming from the goals and strategies of the 2020 Plan and the regional vision developed by the Metropolitan Washington Council of Governments (MWCOG) and the Transportation Planning Board (TPB).

# B. RECOMMENDATIONS

EQAC agrees with the recommendations of the TCC[4] as listed below:

1. Provide for multiple use development patterns that reduce automobile dependency, with a mix of jobs, housing, and services in a walkable environment.

2. Encourage development to be located where it can be served by existing infrastructure.

3. Provide incentives for concentrations of residential and commercial development along transportation/transit corridors within and near the regional core and regional activity centers, such as zoning, financial incentives, transfer of development rights, priority infrastructure financing, and other measures.

4. Take advantage of supportive zoning regulations and other tools that will help promote concentration of development within walking distances of transit facilities, and generally promote a pedestrian orientation in new development.

5. Reduce, rather than increase, vehicle miles traveled (VMT) and VMT per capita in the region.

6. Promote protection of sensitive environmental, cultural, historical, and neighborhood locations.

# LIST OF REFERENCES

[1]Blanton, Whit, AICP. "Integrating Land Use and Transportation." Planning Commissioners Journal, No. 40, Fall, 2000.

[2]Ibid.

[3]McMahon, Edward T. "Road Design—A Turn Ahead." Planning Commissioners Journal, No. 40, Fall, 2000.

[4] Transportation Coordinating Council of Northern Virginia, Task Force on Land Use and Transportation, "The alternative transportation and land use activity strategies study." March 28, 2001.

# APPENDIX A

# EQAC RESOLUTIONS AND POSITIONS JANUARY, 2000 THROUGH OCTOBER, 2001

## CONTENTS

# JOINT RESOLUTION

# ENVIRONMENTAL QUALITY ADVISORY COUNCIL
# TREE COMMISSION

**March 8, 2000**

Whereas the Tree Preservation Task Force representing a broad cross-section of the citizens of Fairfax County has conducted a comprehensive study of past, present and future tree cover and tree preservation requirements for Fairfax County; and

Whereas the work of the Tree Preservation Task Force has resulted in excellent recommendations for increasing tree cover and preserving trees so as to improve the quality of life for the citizens of Fairfax County, and provide habitat for wildlife; and

Whereas those recommendations have been presented to and approved by the Fairfax County Board of Supervisors; and

Whereas it is now desirable to establish mechanisms to implement these approved recommendations and create policy guidance that will insure accomplishment of the Tree Preservation Task Force recommendations;

Now therefore be it resolved that it is the joint recommendation of the Fairfax County Environmental Quality Advisory Council and the Fairfax County Tree Commission that language consistent with the recommendations of the Tree Preservation Task Force be incorporated into the Fairfax County Policy Plan.

It is further resolved that a workgroup comprised of members from the Tree Preservation Task Force, the Fairfax County Environmental Quality Advisory Council, and the Fairfax County Tree Commission be created to draft specific language for inclusion in the County Policy Plan and to work with appropriate County Boards, Commissions, and Agencies towards this end.

# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

# RESOLUTION ON

# MAPPING OF STREAMS AND WATERSHEDS

September 13, 2000

WHEREAS, the Fairfax County Environmental Quality Corridor Policy establishes stream valleys as the core of the EQC system;

WHEREAS, perennial streams and watersheds in the County that collect drainage from 360 or more acres of land are key components of Resource Protection Areas (RPAs) as defined by the County's Chesapeake Bay Preservation Ordinance (Chapter 118 of the *Fairfax County Code*) and are afforded protection in accordance with this ordinance;

WHEREAS, the elements and features comprising EQCs and RPAs are clearly delineated in the *Fairfax County Policy Plan* with specific reference to both the Chesapeake Bay Preservation Ordinance and the EQC Policy;

WHEREAS, the boundaries and areas of watersheds are readily and accurately determinable from the County's existing topographic maps, but the mapping of perennial streams is taken from U. S. Geological Survey 7 1/2 minute quadrangle maps which are known to contain significant errors in the depiction of the course, and particularly the extent, of the perennial portions of the upper ends of the County's watercourses;

WHEREAS, the County Staff routinely applies the Policy Plan provisions during the development review process in order to obtain from applicants commitments for protection of EQCs and RPAs, but the protections achieved can be no better than the often flawed mapping data upon which they are predicated; now therefore,

*BE IT RESOLVED,* that the Environmental Quality Advisory Council urgently requests the Board of Supervisors to direct County Staff to undertake determination and re-mapping of the County's stream valleys and watercourses in order to accurately reflect the true course and extent of all perennial portions thereof;

*BE IT FURTHER RESOLVED,* that EQAC requests that Chapter 118 of the *Fairfax County Code* be amended to provide more precise definitions of RPAs based on the re-mapping recommended above and the regulations and requirements applying thereto.

**EQAC Comments re: Out of Turn Plan Amendment S00-CW-2CP**
**October 11, 2000**

As mentioned in the Staff Report for Out-Of-Turn Plan Amendment S00-CW-2CP, in June, 1998, members of EQAC and the Planning Commission's Environment Committee began talks on the County's Policy Plan as it relates to stream protection issues. EQAC felt that, while the Policy Plan addressed some stream valley issues, there wasn't an overarching statement on what we wanted the conditions of our streams to be.

The proposed amendment addresses that concern and provides clear policy direction for the County's stream valleys. EQAC therefore recommends that the Board of Supervisors adopt the proposed Out-Of-Turn Plan Amendment S00-CW-2CP as presented within the Staff Report dated August 21, 2000, with some changes as noted below.

EQAC suggests three minor changes to the Staff proposal:

1. Add the following sentence to Objective 2, Policy d on page 10 of 12 of the staff report:

   "To the extent possible, ponds constructed in an EQC shall be designed to protect and restore the ecological integrity of the EQC."

   EQAC feels that this sentence is needed to addresses the limited times when ponds are constructed in EQCs, pointing out that steps need to be taken in the overall spirit of Objective 2 which is "Protect and restore the ecological integrity of streams in Fairfax County".

2. Add a new bullet to Objective 2, Policy k on page 11 of 12, following the bullets that address the preservation of wooded areas and the encouragement to fulfill tree cover requirements. This should contain words such as:

   "Where appropriate, use conservation easements as a means toward the preservation of wooded areas and steep slopes and the fulfillment of tree cover requirement through tree preservation."

   At present, the best way to ensure these goals is for the County to purchase portions of the property to be protected or to have the land dedicated to the County or the Park Authority when the land is being rezoned. Often, neither of these options is feasible. EQAC's proposed language adds another viable option to these two choices.

3. Add to the last paragraph of Objective 9 (on page A-2 of the Staff Report) as follows (the underlined sentence is the addition):

   "Preservation should be achieved through dedication to the Fairfax County Park Authority, if such dedication is in the public interest. Otherwise, EQC land should remain in private ownership in separate undeveloped lots with appropriate commitments for preservation. <u>Where possible, these commitments for preservation should be guaranteed through conservation easements.</u>"

   Again, this proposed language adds a viable option aimed at strengthening the commitments for preservation.

EQAC voted at its 11 October 2000 meeting to send these comments to the Board of Supervisors.

*(Position adopted October 11, 2000 and reiterated January 10, 2001)*

EQAC Comments to the Planning Commission
on the
Infill & Residential Development Study
Dated July 26, 2000

Generally, EQAC supports the recommendations in the *Infill & Residential Development Study*, Draft Staff Recommendations Report, dated July 26, 2000 as they apply to environmental protection in the county. In particular:

- Recommendation TR 4, which would increase opportunities to utilize public transportation and increase pedestrian access to retail and community facilities, potentially could lead to reduced automotive use, thereby reducing nonpoint air emissions and improving air quality.

- Recommendations TP 1 through 4 seek to improve tree preservation in the county, particularly during new construction. EQAC has long supported this goal in the county, and we concur with these recommendations.

- Recommendations SW 1 through 13 seek to improve stormwater management in the county. EQAC is concerned that adequate stormwater management is not in place. Moreover, enforcement has been lacking in recent years, leading to cases of damage due to runoff from land disturbing projects. EQAC generally supports the improvements outlined in the document.

However, we are concerned that the recommendations do not go far enough. EQAC remains concerned that little or no attention is given to the cumulative impacts of stormwater runoff within the County, and the recommendations of the Infill Study do not address this critical concern. Fairfax County streams and watersheds continue to be impacted by the failure of comprehensive land use planning and site design that adequately incorporate watershed and stream protection requirements into their plans and fail to consider the cumulative effects of land use decisions. Stormwater runoff and erosion continue to be the largest problems within Fairfax county streams. Most Fairfax County streams have increased stormwater runoff flows that exceed the capacity of the stream. This results in erosion problems throughout the County and contributes to sediment deposition in ponds (both large and small) that requires frequent maintenance and dredging.

In our *Annual Report on the Environment*, 1999, EQAC strongly recommended that a Comprehensive Countywide Stream Management Program be implemented. As part of this Program, we recommended that all water quality monitoring reports and ongoing assessments of existing watershed include point and non-point sources as well as amounts of impervious surface and vegetative cover. We also called for an updated integrated regional stormwater management utility that could give careful examination to each site. Finally, we called for funding of the Stormwater Utility Program as a means to ensure environmental protection, restoration, and monitoring as compared to infrastructure improvement and maintenance.

# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

November 14, 2000

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

Dear Madam Chairman and Members of the Board:

We at EQAC applaud the unanimous decision of the Board of Supervisors on Monday, October 30 to approve the out-of-turn Policy Plan Amendment to add language to the Policy Plan that would protect streams and improve water quality. We would ask that you extend that same concern for our local streams and local water quality to supporting and strengthening the provisions of Virginia's Chesapeake Bay Preservation Area Designation and Management Regulations. The Chesapeake Bay Local Assistance Board and Chesapeake Bay Local Assistance Department are considering modifications to these Regulations, and we understand that the Board of Supervisors will be considering this matter at its November 20 meeting.

We view the most significant part of the Regulations as those that govern the description and definition of the Resource Protection Area (RPA) buffers. These buffers have been defined as areas "not less than 100 feet in width located adjacent to and landward of" tidal wetlands; nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams; and tidal shores. In addition, 100 foot wide buffer areas are required along both sides of any tributary stream. These buffers provide the single largest water quality benefit when implemented properly and in their entirety. This County recognized that benefit many years prior to the enactment of the Chesapeake Bay Preservation Act with the development and implementation of the Environmental Quality Corridor (EQC) policy in stream valleys throughout Fairfax County. We therefore urge the Board of Supervisors to support the continued implementation of the 100 foot buffer requirement and to disallow all intrusions into the buffer. To that end we ask that the Board ask the Chesapeake Bay Local Assistance Department to:

1) Reject the proposed permitting of sub-division scale and regional scale flood control and stormwater management facilitates within the RPA;

2) Severely limit or restrict the removal of "dead or diseased trees or shrubs" and "noxious weeds" from the buffer area, and any other activities that reduce the amount of vegetation already in the designated buffer areas. Should there be removal of vegetation, require replacement by vegetation with plants equal in function; and

3) Severely limit or restrict the removal of vegetation for "scenic vistas". Also require replacement of removed vegetation with plants equal in function if such removal occurs.

Designation of Resource Protection Areas (RPAs) is dependent upon a clear and precise delineation of perennial streams within the County. EQAC has already contacted the Board regarding the map flaws in the United States Geological Survey Maps, which are used for perennial stream designations. On October 16, the Board of Supervisors unanimously passed a motion to refer this matter to the staff for resolution. We ask also that the Fairfax County Board of Supervisors support language within the Chesapeake Bay Preservation Area Designation and Management Regulations that calls for an accurate and real designation of perennial streams throughout the Chesapeake Bay watershed.

We look forward to working with the Board of Supervisors in Fairfax County efforts to steward the streams and waters of the Chesapeake Bay watershed.

Sincerely,

Robert D. McLaren, Chairman
Environmental Quality Advisory Council

# Resolution
## Of the
# Fairfax County Tree Commission

**December 6, 2000**

**(ENDORSED BY THE ENVIRONMENTAL QUALITY ADVISORY COUNCIL, DECEMBER, 2000)**

Whereas the lack of state enabling legislation is a barrier to effective tree preservation in Fairfax County;

Therefore, now be it resolved, that the Fairfax County Tree Commission recommends that the Fairfax County Board of Supervisors add to the 2001 legislative agenda, for the meeting of the Virginia General Assembly, tree preservation as a priority for future land development within Fairfax County.

# FAIRFAX COUNTY
# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

April 11, 2001

Dear Supervisor McConnell:

Per your request, EQAC reviewed the two proposals for the Rt.28 Corridor Improvement Program. The first proposal is by the Route 28 Corridor Improvements, LLC (Clark Construction Group and Shirley Contracting Corporation) while the second proposal is by Fluor Daniel and Morrison Knudsen LLC (FD/MK).

We looked at these proposals in terms of runoff, land impact, and wetlands. The amount of information on environmental impact in these proposals is limited, with the Clark-Shirley proposal containing the least amount of information. Given that caveat, we believe that the FD/MK proposal is superior for a number of reasons.

In the first area, storm water runoff, both proposals will comply with the Virginia Stormwater Management (SWM) Handbook (1999). Both proposals recognize the requirement for Best Management Practices. Neither proposal gives consideration to innovative stormwater management concepts. In fact, the Clark-Shirley proposal appears to rule out bioengineering approaches. EQAC would like to see consideration given to these innovative approaches. Quite often the innovative approaches are more environmentally friendly that the standard SWM designs. In this area, neither proposal appears to shine.

In the second area, land impact, the FD/MK proposal appears superior. The FD/MK proposal is far more detailed. This level of detail addresses the interchanges and gives better information about what will actually be required to complete the project. The amount of land required appears to be less than that under the Clark-Shirley proposal.

The reduced land required for the FD/MK plan directly impacts the third area – wetlands. Here the FD/MK plan is superior, with the Clark-Shirley plan apparently taking 12.14 acres and the FD/MK plan taking 10.49 acres – a reduction of 14 percent. Furthermore, the FD/MK proposal is stronger in that it recognizes the necessity to conduct joint field delineations and surveys. Additionally, the FD/MK proposal calls for the establishment of a Technical Advisory Group. Based on the proposed membership of this group, environmental issues such as wetlands would be addressed in the advisory group.

The main difference in the proposals is the FD/MK focus on HOT lanes. Clark-Shirley touts the simplicity in avoiding toll collection. This approach seems to be the opposite direction taken by heavily populated areas in the Northeastern US. Construction of a large freeway is sure to attract large volumes of interstate traffic, including heavy trucks, which degrade air quality and contribute to gridlock. The FD/MK proposal for smart tag/tolls provides a method to pay for the highway in the short term and avoid additional expansion in the long term. Not to mention the reduction in cost to the residents who live

in the area of the highway. There is also an ability to increase tolls as congestion or need to control traffic in the HOT lanes arises.

In conclusion, EQAC would like to see increased attention given to innovative practices for SWM, increased emphasis on reducing the limits of clearing and grading, and careful attention to further reducing wetland impacts.

Sincerely,

*(signed by Chairman)*
Robert McLaren

*Adopted by EQAC on May 9, 2001*

## FAIRFAX COUNTY
## ENVIRONMENTAL QUALITY ADVISORY COUNCIL
## RESOLUTION REGARDING RECOMMENDATIONS FOR MODIFICATION OF CHAPTER 118 OF THE FAIRFAX COUNTY ORDINANCES

WHEREAS, The Board of Supervisors accepted the finding of the Environmental Quality Advisory Council (EQAC) that the present designations of perennial tributary streams qualifying as Resource Protection Areas (RPAs) are seriously flawed;

WHEREAS, These deficiencies result from the use of U. S. Geological Survey 7 1/2 minute quadrangle maps as the sole source for identifying the perennial portions of tributary streams;

WHEREAS, Pursuant to the EQAC recommendation, the Board of Supervisors directed staff to prepare a plan for remapping the streams of Fairfax County;

WHEREAS, The plan submitted by staff on May 7, 2001, indicates a 36 month time frame for completion of the effort and outlines two approaches: 1) complete the remapping and present the finished product to the Board for approval at the end of 36 months or 2) submit the results for each stream valley for approval as it is completed;

WHEREAS, Certain minimal revisions to Chapter 118 (Chesapeake Bay Preservation Ordinance) of the Fairfax County Code are required in order to implement either of the above approaches; now therefore

BE IT RESOLVED, That the Environmental Quality Advisory Council strongly advocates and supports the second (or incremental) approach outlined in the plan prepared by staff, since it places RPA protection on streams in the most timely manner; and

BE IT FURTHER RESOLVED, That the Environmental Quality Advisory recommends modification of two provisions of Chapter 118 of the Code as detailed in the attachment to this resolution.

**MODIFICATIONS TO FAIRFAX COUNTY ORDINANCES REQUIRED TO ACCOMMODATE INCREMENTAL IMPLEMENTATION OF THE FAIRFAX COUNTY STREAM REMAPPING PROJECT AND THE STREAM PROTECTION STRATEGY**

In the two modifications recommended below, deleted text in the current ordinance is shown in ~~strikeout type~~ and added text is shown in **boldface type**.

CHAPTER 118. Chesapeake Bay Preservation Ordinance

Section 118-1-6. Definitions

(o) *Major floodplain* means those land areas in and adjacent to streams and watercourses subject to continuous or periodic inundation from flood events with a one percent (1%) chance of occurrence in any given year (i.e., the 100-year flood frequency event) and having a drainage area equal to or greater than ~~three hundred sixty (360) acres~~ **fifty (50) acres**.

(cc) *Tributary stream* means ~~any perennial stream~~ **the perennial portion of any watercourse** that is so depicted on **any of the following:**

**1)** The most recent U. S. Geological Survey 7 1/2 minute topographic quadrangle map (scale 1:24,000); **or**

**2) Any relevant overlay map (verified for accuracy) in the Fairfax County Geographic Information System (GIS); or**

**3) A stream valley map that is part of the Fairfax County Stream Protection Study; or**

**4) A specially prepared map, in a form approved by the Director of the Department of Public Works and Environmental Services, certified as to accuracy by a technically competent organization, such as Northern Virginia Soil and Water Conservation District, Audubon Naturalist Society, a University or Research Institution;**

**whichever of the above shall be most inclusive of the watercourse and all of its perennial branches. The presence of the botanical genus *Fontinalis*, or such other indicator species as shall from time to time be designated, shall be prima facie evidence of perenniality.**

*Adopted by EQAC on May 9, 2001*

## FAIRFAX COUNTY
## ENVIRONMENTAL QUALITY ADVISORY COUNCIL
## RESOLUTION REGARDING
## INTERIM STREAM PROTECTION

WHEREAS, Fairfax County is required to comply with state and regional compact regulations regarding protection of the Chesapeake Bay and waters tributary thereto, including the establishment of Resource Protection Areas (RPAs) for one hundred feet on each side of any perennial tributary stream;

WHEREAS, All Fairfax County streams ultimately reach the Potomac River and, therefore, under the Chesapeake Bay regulations are, de facto, tributary streams, although parts of many of them are not so characterized due to defective definitions in applicable ordinances;

WHEREAS, The Fairfax County Board of Supervisors, in January 2001, accepted and endorsed a staff study titled the Fairfax County Stream Protection Strategy which documented requirements for stream protection;

WHEREAS, The Fairfax County Environmental Quality Advisory Council, in October 2000, by resolution to the Board of Supervisors, noted the serious inaccuracies in the U. S. Geological Survey 7 1/2 minute quadrangle maps currently used for determining perennial tributary stream and recommended remapping of Fairfax County stream valleys to accurately determine the source and location of perennial flow in Fairfax county watercourses;

WHEREAS, The Board of Supervisors directed staff to develop a plan for accomplishing such remapping and staff on May 7, 2001, delivered to the Board an updated version of this plan which would require 36 months for completion;

WHEREAS, A number of park and school development projects have been proposed on tracts of land that contain streams that are not now correctly mapped as perennial tributary streams but that would be designated as Resource Protection Areas upon correction of the present defective mapping; now therefore

BE IT RESOLVED, That the Environmental Quality Advisory Council requests the Board of Supervisors, the Park Authority, the School Board, and the Planning Commission of Fairfax County to approve or adopt no plan (including park or school master plans), or modification of any existing plan, for any lands under their ownership or control that allows or contemplates any land disturbing activity within one hundred feet of any stream on such land until its proper status is determined by the stream remapping study.

# FAIRFAX COUNTY
# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

June 19, 2001

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

Dear Madam Chairman and Members of the Board:

After EQAC presented its 2000 Annual Report on the Environment (ARE) to the Board of Supervisors, the Board directed Fairfax County Staff to respond to EQAC's recommendations. EQAC is now reviewing Staff's responses and will incorporate our comments on these responses in the Scorecard in our 2001 Annual Report.

EQAC, however, would like to pass on to the Board of Supervisors our overall impression of the Staff responses. We find that the Staff responses are very well thought out. It is evident that the Staff carefully evaluated EQAC's recommendations. Where Staff differed with EQAC's recommended approach, they considered alternative approaches to achieve the same goal. Furthermore, the Staff responses went into significant detail on how to implement EQAC's recommendations. The responses were also coordinated between the appropriate Staff agencies rather than each agency replying on its own.

The Environmental Coordinating Committee coordinated the Staff responses. This is a first for the group and the product was far superior to past Staff responses. Please pass on to all Fairfax County Staff members involved in preparing responses to EQAC's 2000 ARE our thanks for a very thorough and thoughtful set of responses.

Sincerely,

*(signed by Chairman)*

Robert D. McLaren, Chairman
Environmental Quality Advisory Council

# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

## RESOLUTION REGARDING STORMWATER AND BMP WAIVERS

**July 11, 2001**

WHEREAS, Fairfax County has enacted ordinances and administrative regulations that require post-development stormwater runoff from sites of proposed development be no greater than pre-development runoff and that such water discharged from the site meet certain standards imposed by the Chesapeake Bay compacts; and

WHEREAS, In calendar year 2000, roughly thirty six (36) percent of site and subdivision plans reviewed by the Department of Public Works and Environmental Services (DPWES) requested and were granted waivers from such stormwater detention requirements and some forty-five (45) percent of plans reviewed requested and were granted waivers of water quality (BMP) requirements; and

WHEREAS, For a six month period in 1999, only approximately four (4) percent of requested stormwater detention waivers and three (3) percent of requested water quality waivers were denied; and

WHEREAS, For that same period, approximately twenty-nine (29) percent of detention requests and fifteen (15) percent of water quality waiver requests were granted on the grounds that off-site detention or BMP controls were provided, but often the assertions that such controls were in place and of adequate capacity were not adequately documented by the applicant or field-verified by County staff; and

WHEREAS, For that same period, approximately thirty-five (35) percent of detention waiver requests were granted based on the applicant's assertion that there would be no increase in runoff, but the validity of such assertions is extremely improbable and analysis suggests that most are based on very different sets of assumptions that maximize calculated pre-development runoff and minimize calculated post-development runoff; and

WHEREAS, For that same period, approximately four (4) percent of detention waivers were granted based on the applicant's assertion that drainage from the site would discharge into a major floodplain, but it is suggested that such assertions are rarely supported by an "adequate outfall" analysis; and

WHEREAS, For that same period, approximately fifteen (15) percent of detention waivers and four (4) percent of water quality waivers were granted on the grounds that they discharge into a watercourse or area for which a regional stormwater management facility is proposed, but it is well known and understood that many of these planned facilities will never be built and even if constructed will be years away; and

WHEREAS, Under current "adequate outfall" requirements, a design engineer must demonstrate only that the discharge of a site into a man-made system (e.g., a piped storm sewer) will not exceed the capacity of such system in a ten-year storm, and that discharge into an erodible channel (i.e., a grass lined swale or an existing watercourse) must be sufficient for a two-year storm (e.g., without overtopping the banks and/or eroding the channel); and

WHEREAS, DPWES reviewers possess varying degrees of expertise on stormwater management and BMP issues, which leads to inconsistent decisions in determining the adequacy of stormwater management designs; and

WHEREAS, Only upon receiving complaints do DPWES reviewers make visits to the sites for which waivers are requested in order to determine the accuracy and adequacy of the design engineer's assumptions, calculations and narrative; now therefore,

BE IT RESOLVED, That the Environmental Quality Advisory Council requests the Board of Supervisors and the County Executive to direct the Department of Public Works and Environmental Services as follows:

1. Subject requests for waiver of stormwater detention and/or water quality requirements to a higher standard of scrutiny and proof before granting.

2. Critically evaluate assertions that off-site controls are in place and analyze their adequacy to meet the increased loads imposed by the applicant's site.

3. Critically review applications for waivers based on the contention that there will be no increase in runoff, which is highly improbable, exercising due care to see that there are not gross discrepancies between pre-development and post-development assumptions and methods of calculation.

4. No longer grant waivers permitting discharge of water from a site into a major floodplain unless extensive and appropriate 'adequate outfall" measures are made part of the site plan.

5. Since "future ponds" provide no current protection and, in fact, may never be constructed, grant no further waivers of either stormwater detention or water quality requirements on these grounds.

6. Require that all "adequate outfall" calculations and analyses be based on a range of storms, beginning with the smallest storm that causes incipient erosion up to a ten-year event, regardless of the type of system to which the water from the site is delivered.

7. Provide training to DPWES reviewers so as to raise the overall level of expertise.

8. Require an on-site evaluation by the DPWES reviewer where any part of the applicant's request for waiver is open to question on the grounds of input assumptions, analytical calculation, or narrative justification.

## FAIRFAX COUNTY
## ENVIRONMENTAL QUALITY ADVISORY COUNCIL
## RESOLUTION REGARDING PROPOSED PERMIT REAPPLICATION FOR FAIRFAX COUNTY'S MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)

**July 11, 2001**

On July 11, 2001, the Fairfax County Environmental Quality Advisory Council (EQAC) adopted the following resolution regarding the proposed submission of a permit reapplication for Fairfax County's Municipal Separate Storm Sewer System (MS4):

EQAC supports the MS4 Plan as presented.

This resolution was adopted by a unanimous vote of all members present.

## FAIRFAX COUNTY
## ENVIRONMENTAL QUALITY ADVISORY COUNCIL
## RESOLUTION REGARDING PROPOSED CLOSURE OF THE COMPRESSED NATURAL GAS REFUELING SITE

**July 11, 2001**

On July 11, 2001, the Fairfax County Environmental Quality Advisory Council (EQAC) adopted the following resolution regarding the proposed closure of the compressed natural gas (CNG) refueling site at the West Ox Maintenance Facility:

- EQAC recommends that the CNG facility be removed as soon as possible;
- EQAC recommends that the County move to purchase Ultra Low Sulfur Diesel (ULSD) fuel for its diesel fuel vehicle fleet;
- EQAC recommends that the implementation of conversion to ULSD fuel be accelerated from the schedule mandated by the Clean Air Act;
- EQAC recommends that, as the County purchases new diesel engine vehicles, the new vehicles incorporate those engines that can best use ULSD to reduce emissions into the atmosphere; and
- EQAC recommends that the County continue to investigate and track alternate fuels and, if and when their successful application would appear to be feasible, consider the use of such fuels.

This resolution was adopted by a unanimous vote of all members present.

# ENVIRONMENTAL QUALITY ADVISORY COUNCIL

July 27, 2001

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

Dear Madam Chairman and Members of the Board:

At the July 11, 2001 meeting of the Environmental Quality Advisory Council (EQAC), the Council discussed recent land acquisitions by the Board of Supervisors and the criticisms that these land acquisitions have elicited. EQAC supports the efforts that the Board has taken over the past year to acquire and protect open space, and we encourage the Board to continue to take advantage of opportunities to acquire park land as these opportunities present themselves. Much of the land that the Board has acquired has significant environmental value, and it is the view of EQAC that the acquisition of this land reflects considerable foresight on the part of the Board. By a unanimous vote of the members present at the July 11 meeting, EQAC asked me to convey its support for your recent actions.

Sincerely,

*(signed by Chairman)*

Robert D. McLaren, Chairman
Environmental Quality Advisory Council

cc: EQAC File, July, 2001

# APPENDIX B

# FAIRFAX COUNTY
# ENVIRONMENTAL EXCELLENCE AWARDS
# 2000 AND 2001

The Fairfax County Environmental Excellence Awards have been established to recognize County residents, organizations, businesses, and County employees who unselfishly dedicate time, energy, and expertise for the betterment of the environment in support of countywide environmental goals and initiatives. Award recipients are selected by the Environmental Quality Advisory Council, and the awards are presented each fall during a meeting of the Fairfax County Board of Supervisors.

The recipients of the 2000 and 2001 Environmental Excellence Awards were:

2001

| | |
|---|---|
| County Resident Award: | Chris Koerner |
| Organization Award: | Bailey's Beautification Alliance |

2000

| | |
|---|---|
| County Resident Award: | Norma Hoffman |
| Organization Award: | Friends of Sugarland Run |
| County Government Employee Award: | Gary Roisum |

EQAC congratulates the award recipients.

The nomination period for the Environmental Excellence Awards occurs during the spring of each year. EQAC encourages interested individuals, organizations, and businesses to submit nominations.

# APPENDIX C

# ACRONYMS USED WITHIN THE 2000 AND 2001 ANNUAL REPORTS

| | |
|---|---|
| **A&F** | **Agricultural and Forestal** |
| **AIR 21** | **W.H. Ford Aviation Investment and Reform Act of the 21st Century (Federal)** |
| **ANS** | **Audubon Naturalist Society** |
| **AQI** | **Air Quality Index** |
| **BMP** | **Best Management Practice** |
| **BOS** | **Board of Supervisors (County)** |
| **Bt** | ***Bacillus Thuringiensis*** |
| **BWI** | **Baltimore-Washington International Airport** |
| **$^{o}$C** | **Degrees Centigrade** |
| **CAAN** | **Committee Against Aircraft Noise** |
| **CBLAB** | **Chesapeake Bay Local Assistance Board (State)** |
| **CCR** | **Consumer Confidence Report** |
| **CDC** | **Centers for Disease Control (Federal)** |
| **CDM** | **Camp, Dresser and McKee** |
| **CEQ** | **Council on Environmental Quality (Federal)** |
| **CESQG** | **Conditionally Exempt Small Quantity Generator** |
| **CNEL** | **Community Noise Equivalent Level** |
| **CO** | **Carbon monoxide** |
| **$CO_2$** | **Carbon dioxide** |
| **COG** | **Metropolitan Washington Council of Governments (Regional—Also cited as MWCOG)** |
| **CONANDA** | **Committee on Noise Abatement at National and Dulles Airports (Regional)** |
| **dB** | **Decibel** |
| **dBA** | **Decibel (A-weighted level scale)** |
| **DC** | **District of Columbia** |
| **D/DB-P** | **Disinfectant/Disinfection By-products** |
| **DEQ** | **Department of Environmental Quality (State)** |
| **DNL** | **Day-Night sound level (also referred to as "Ldn")** |
| **D.O.** | **Dissolved oxygen** |
| **DPWES** | **Department of Public Works and Environmental Services (County)** |
| **DPZ** | **Department of Planning and Zoning (County)** |
| **E&S** | **Erosion and Sediment** |
| **ECC** | **Environmental Coordinating Committee (County)** |
| **EFID** | **Environmental and Facilities Inspection Division (County)** |
| **EHD** | **Epizootic hemorrhagic disease** |
| **EIS** | **Environmental Impact Statement** |

| | |
|---|---|
| **EPA** | **Environmental Protection Agency (Federal)** |
| **EPCRA** | **Emergency Planning and Community Right-to-Know Act (Federal)** |
| **EPG** | **Engineer Proving Ground (U.S. Army)** |
| **EQAC** | **Fairfax County Environmental Quality Advisory Council** |
| **EQC** | **Environmental Quality Corridor (County)** |
| **ERIC** | **Ecological Resources Inventory Committee (County)** |
| **E/RRF** | **Energy / Resource Recovery Facility** |
| **ESWTR** | **Enhanced Surface Water Treatment Rule (Federal)** |
| **$^{o}$F** | **Degrees Fahrenheit** |
| **FAA** | **Federal Aviation Administration** |
| **FAR** | **Federal Aviation Regulations** |
| **F.C.** | **Fecal Coliform** |
| **FCPA** | **Fairfax County Park Authority** |
| **FCWA** | **Fairfax County Water Authority** |
| **FJLEPC** | **Fairfax Joint Local Emergency Planning Committee (Regional)** |
| **FY** | **Fiscal year** |
| **GAC** | **Granular Activated Carbon** |
| **GIS** | **Geographic Information System** |
| **GMU** | **George Mason University** |
| **GPS** | **Global Positioning Satellite** |
| **HAI** | **Helicopter Association** |
| **HAP** | **Hazardous air pollutant** |
| **HazMat** | **Hazardous materials** |
| **H.B.** | **House Bill (State)** |
| **HHW** | **Household Hazardous Waste** |
| **H.J.** | **House Joint Resolution (State)** |
| **HMERP** | **Hazardous Materials Emergency Response Plan** |
| **HOT** | **High Occupancy Toll** |
| **HOV** | **High Occupancy Vehicle** |
| **HR** | **House of Representatives Resolution (Federal)** |
| **IBI** | **Index of Biotic Integrity** |
| **ICPRB** | **Interstate Commission on the Potomac River Basin (Regional)** |
| **IESNA** | **Illuminating Engineering Society of North America** |
| **IPM** | **Integrated Pest Management** |
| **kW** | **kilowatts** |
| **LEPC** | **Local Emergency Planning Committee** |
| **MCL** | **Maximum Contaminant Level (for drinking water)** |
| **MD** | **Maryland** |
| **mg** | **million gallons** |
| **mgd** | **million gallons per day** |
| **mg/l** | **milligrams per liter** |
| **ml** | **milliliter** |
| **MPO** | **Metropolitan Planning Organization** |
| **MS4** | **Municipal Separate Stormwater Permit** |
| **MTBE** | **Methyl Tertiary Butyl Ether** |
| **MWAA** | **Metropolitan Washington Airports Authority (Regional)** |
| **MWAQC** | **Metropolitan Washington Air Quality Committee (Regional)** |
| **MWCOG** | **Metropolitan Washington Council of Governments (Regional—Also cited as COG)** |

| | |
|---|---|
| **NAAQS** | **National Ambient Air Quality Standard** |
| **NCPCP** | **Noman M. Cole, Jr. Pollution Control Plant** |
| **NIRS** | **Noise Integrated Routing System** |
| **NMOC** | **Non-methane organic compounds** |
| **NOx** | **Oxides of Nitrogen/Nitrogen Dioxide** |
| **NPDES** | **National Pollutant Discharge Elimination System** |
| **NPS** | **Nonpoint source pollution** |
| **NRCS** | **Natural Resources Conservation Service (Federal)** |
| **NRDC** | **Natural Resources Defense Council** |
| **NTU** | **Nephelometric turbidity units** |
| **NVBIA** | **Northern Virginia Building Industry Association** |
| **NVRC** | **Northern Virginia Regional Commission (Regional)** |
| **NVRPA** | **Northern Virginia Regional Park Authority** |
| **NVSWCD** | **Northern Virginia Soil and Water Conservation District (Regional)** |
| **$O_2$** | **Oxygen** |
| **OSHA** | **Occupational Safety and Health Administration (Federal)** |
| **PFM** | **Public Facilities Manual (County)** |
| **pH** | **Scale of acidity and alkalinity** |
| **PM** | **Particulate Matter** |
| **PM2.5** | **Particulate Matter less than 2.5 microns in diameter** |
| **Ppm** | **parts per million** |
| **QA** | **Quality Assurance** |
| **QC** | **Quality Control** |
| **RCFP** | **Recessed Chamber Filter Presses** |
| **RDOC** | **Recycling Drop-off Centers** |
| **SARA** | **Superfund Amendments and Reauthorization Act of 1986 (Federal)** |
| **S.B.** | **Senate Bill (State)** |
| **SDAT** | **Sector Design and Analysis Tool** |
| **SIP** | **State Implementation Plan** |
| **S.J.** | **Senate Joint Resolution (State)** |
| **SMCL** | **Secondary Maximum Contaminant Level** |
| **$SO_2$** | **Sulfur dioxide** |
| **SPS** | **Stream Protection Strategy (County)** |
| **SUAG** | **Stormwater Utility Advisory Group (County)** |
| **SWCB** | **State Water Control Board** |
| **SWPD** | **Stormwater Planning Division (County)** |
| **SWRRC** | **Solid Waste Reduction and Recycling Centers** |
| **TAAM** | **Total Airspace and Airport Modeler** |
| **TCLP** | **Toxicity Characteristic Leaching Procedure** |
| **THM** | **Trihalomethanes** |
| **TMDL** | **Total Daily Maximum Load** |
| **TPB** | **Transportation Planning Board (Regional)** |
| **TPQ** | **Threshold planning quantity** |
| **TTHM** | **Total trihalomethanes** |
| **TRACON** | **Terminal Radar Approach Control** |
| **UGB** | **Urban Growth Boundary** |
| **ug/l** | **Microgram per liter** |
| **UNESCO** | **United Nations Educational, Scientific and Cultural Organization** |

| | |
|---|---|
| **UOSA** | **Upper Occoquan Sewage Authority** |
| **USDA** | **United States Department of Agriculture** |
| **VA** | **Virginia** |
| **VDEQ** | **Virginia Department of Environmental Quality** |
| **VDGIF** | **Virginia Department of Game and Inland Fisheries** |
| **VDH** | **Virginia Department of Health** |
| **VDOT** | **Virginia Department of Transportation** |
| **VMT** | **Vehicle miles travelled** |
| **VOC** | **Volatile organic compound** |
| **VPDES** | **Virginia Pollutant Discharge Elimination System** |
| **WID** | **Watershed Improvement District** |
| **WWTP** | **Wastewater treatment plant** |
| **YIMBY** | **Yes In My Back Yard** |

The cover was provided by Andrea Ceisler of the Northern Virginia Soil and Water Conservation District.

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